the Iron Age

A Chilton Publication

THE NATIONAL METALWORKING WEEKLY • DECEMBER 29, 1955

STEEL: Free World boom outpaces Reds
See page 23

During 1955 . . . we at CF&I have improved both our plant facilities and our operations so that we will be in an even better position to serve you in the future. Typical of these improvements is this 3,000-ton press, a recent addition to the pressing facilities at our Claymont, Delaware, Plant. We look forward to serving you during 1956.

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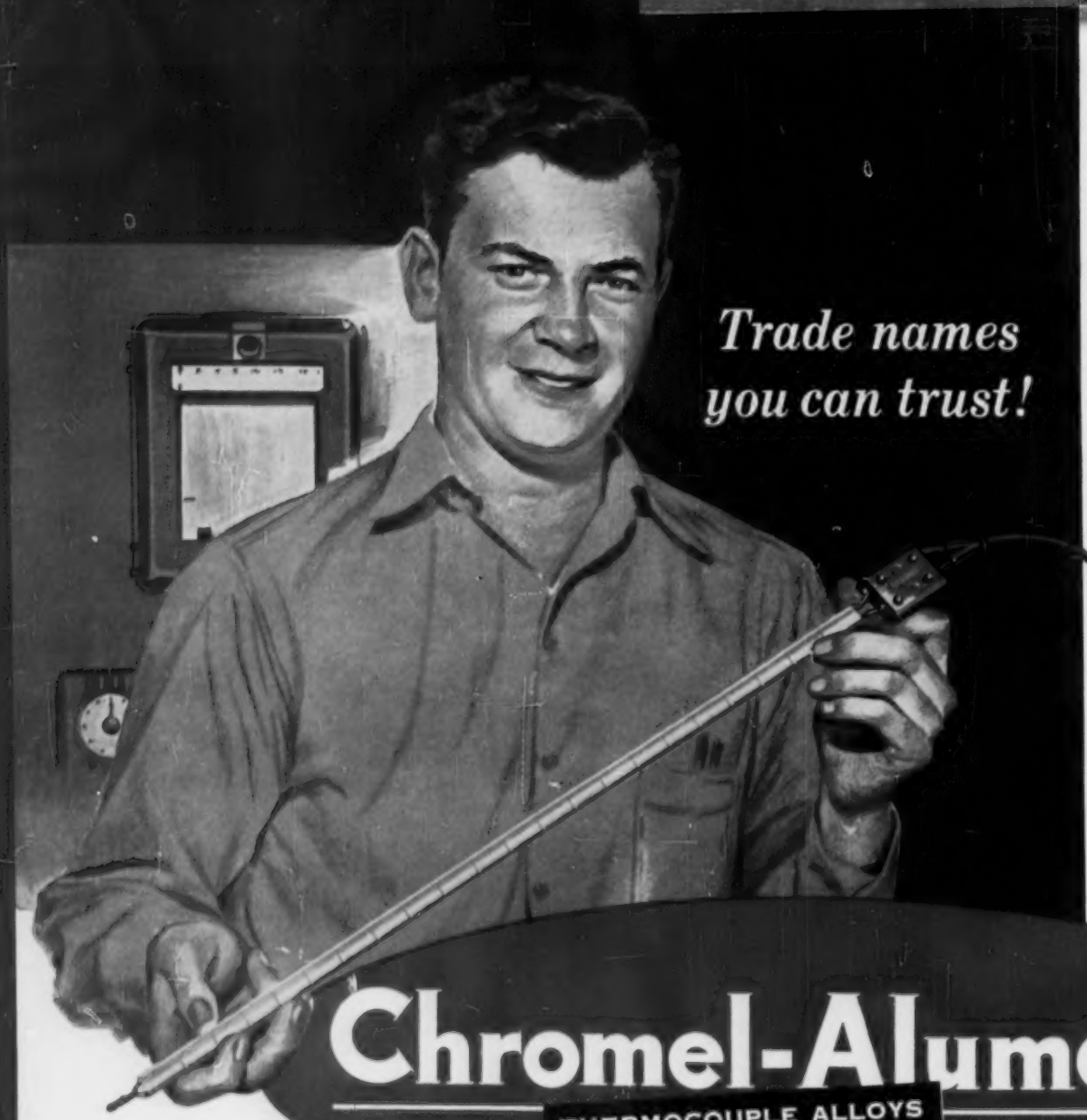

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Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

Notching Die Made of Bearcat Gives 7 Times Greater Output

An interesting item being manufactured in the southeastern part of the country is a windshield garnish molding for a popular make of automobile. The molding is produced from cold-rolled steel, 0.020 in. thick. It is formed by a notching die, hardened to Rockwell C 56-58.

With the grades of shock-resisting tool steel formerly used for the die, a maximum of 1400 pieces was produced before breakage occurred. Because of the severity of the application, this was considered good production even though it necessitated a change of die about five times daily.

After studying the operation, we suggested a change to Bearcat tool steel. "Bearcat is a super shock-resisting grade," we said. "We're sure it will last longer in a tough job like this, and so save you money. Why don't you give it a try?"

So Bearcat was put to work. The dies made of Bearcat have been giving a good account of themselves by producing up to 10,000 pieces before being replaced. That's seven times the output obtained from the dies before changing to Bearcat.

Surprising? Not at all. Bearcat is continually chalking up new performance records in a variety of interesting applications. Bearcat is a superior, general-purpose grade of air-hardening tool steel. It has exceptional resistance to shock, and is also well suited for uses where hot-work properties and easy machining are essential. Bearcat can be used in a wide range of applications such as punches, master hobs, engraving dies, and short-run dies used in cold-forming, blanking and bending.

The best way to determine how good a job Bearcat can do is to put it to work on some difficult job in your shop. You can order Bearcat through your local Bethlehem tool-steel distributor. We also carry it in stock in our mill depot.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Retemper Tools After Grinding

No matter how carefully performed, grinding operations on hardened tools always generate residual stresses in the tools. But as tools already contain residual stresses after they are quenched, any additional stresses are likely to cause trouble. Now, if the combined stresses are sufficiently high, cracking may occur during grinding, which makes it easy to locate the source of the trouble. But if the combined residual stresses are just below the ultimate strength of the steel, cracks will not appear for the time being. Instead, the tools are apt to crack subsequently, at the application of normal stresses set up either in handling, or in using the tools.

To avoid this difficulty, we recommend reducing the stresses to a safe level by retempering the tools immediately after grinding, using a temperature which is slightly lower than the original tempering temperature. With many toolmakers, retempering after grinding is routine procedure, a form of insurance, more or less, against running into trouble.

BLANKING DIE FOR HANDBAG HANDLES

This blanking die, used by Westberg Tool and Manufacturing Company, Bridgeport, Conn., for the manufacture of handbag handles, has BTR (Bethlehem Tool Room) tool steel in both the die and the punch. BTR is our long-wearing, general-purpose, manganese-chromium-tungsten grade of oil-hardening tool steel.

the Iron Age

DIGEST OF THE WEEK

Vol. 176, No. 26 December 29, 1955

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NEWS DEVELOPMENTS

FREE WORLD WIDENS STEEL LEAD OVER REDS — P. 23
Free nations make strong comeback in 1955. Gain 22.5 pct production compared with only 10.5 pct in Red-dominated countries. Free World produced 223 million tons of steel during year; Reds only 68 million. Reds are forced to spend heavily on mill developments to produce more flat-rolled products. Russian technicians are going into oxygen process.

THE INSIDE STORY ON SCRAP EXPORTS — P. 25
Luria president sees no early easing in world scrap demand. But he opposes government control of exports on grounds that it would amount to price control. Anyone seeking to enter scrap export business faces multitude of problems. They range from getting order and charting ship to insuring against losses over the side in handling at the dock.

U. S. STEEL MAKES BIG EXPANSION PLANS — P. 26
In the next two to three years, U. S. Steel Corp. will add 2.5 million ingot tons to its capacity. Biggest additions will come at the company's Chicago and Western plants. Improved facilities will account for most of the new tonnage, which is being planned in accordance with regional market needs.

MODERN WATCHMAKING IS A FINE ART — P. 27
Behind-the-scenes production highlights in turning out a modern timepiece are a fascinating story of metalworking in miniature. Developing a new movement takes thousands of manhours, hundreds of different size materials and tools. Throughout the entire operation, metallurgy plays a key role.

WHAT FORD'S FINANCIAL STATEMENT SHOWS—P. 36
During the first nine months of this year, Ford sales totaled $4,042,600,000. Net income for same period was $312,200,000. Total capital and earnings retained as surplus at the end of September was $1,840,000,000. Statement shows just how far the company has come since 1946 when there was a net loss of $8.1 million.

AIR FORCE DOWN FOR BIGGEST BUDGET HIKE — P. 41
Defense Dept. will ask Congress for $35.5 billion for fiscal 1957. Of this, 17.2 billion is slated for Air Force spending. Guided missiles will figure heavily in new Air Force buying, with emphasis being placed on projectiles in the mid-range category.

IN METALWORKING

ENGINEERING & PRODUCTION

DOWN COME ALUMINUM CASTING COSTS — P. 61
Many foundrymen would question the economics of producing large aluminum castings in permanent molds. But it is being done successfully and economically, on both long and short run parts, with a simplified machine. Castings weighing up to 70 lb are now in production.

BARREL PLATING SETUP IS FAST, VERSATILE — P. 65
A new plating system handles 20,000 lb of work hourly, yet is sufficiently versatile to permit changing plating conditions every 1½ minutes. Each 500 lb batch is automatically immersed into from 6 to 20 plating stations by a dial-type device for required thickness.

WATER-LUBRICATED WOOD ROLLS BEVEL PARTS—P. 68
A home-grown two-stand machine forms aluminum on short production runs that formerly tied up 10-stand equipment. Water-lubricated, laminated wood rolls have beveled more than a million parts with only minor resurfacing.

MARKETS & PRICES

CANADA'S MINING MARKET CONTINUES CLIMB—P. 28
A record $378 million went into equipment for Canadian mines. Next year's outlays may be even bigger. Canadian iron ore deposits are largely untapped. Uranium hunters prowl the northlands. A number of large developments are just getting rolling.

FRANCE PUSHES METALWORKING EFFICIENCY—P. 47
A census of metalworking equipment marks the beginning of a French drive to step up production efficiency. Study is expected to show up backward segments of the country's industry. Modernization will call for importing U. S. tools, which now face tough restrictions on the Continent.

COPPER SITUATION CONTINUES UNFAVORABLE—P. 94
Prospects of a rapid settlement between the striking mine workers in Chile and the government have completely disappeared. Government must revise its strategy. Indications are that consumers will not get all the metal they need in 1956.

NEXT WEEK:

101st Annual Review and Forecast

BUSINESS OUTLOOK — CONTINUED BRISK FOR '56
Steel, machine tool, aircraft industry order backlogs, near capacity auto production in the months ahead, defense and other government spending, a continuing construction boom—most economic signposts point to a promising 1956. Here's a preview to help in guiding your business planning for the months ahead.

MATERIALS — HARDER TO GET, HIGHER IN PRICE
There's little chance of easing in the materials supply situation for metalworking consumers in the months ahead. It's the price paid for the promise of continued high production. Steel, aluminum have plans to increase capacity, but there's little prospect of any relief until well into the year, at least. Here's the way the picture looks for the coming months.

LABOR — LEAN AND READY, LOADED FOR BEAR
Organized labor will score again in '56. It will go after higher wages, more fringe benefits, extension of supplementary unemployment benefits to more industries. It will play an important role in politics. Management must be ready to meet labor offensive.

GOVERNMENT'S ATTITUDE — FLAVORED BY POLITICS
Government's attitude toward business in '56 will be conditioned by election year politics. Before next November, more than a dozen national issues affecting industry will get Congressional attention. Here's how things look now on defense spending, taxes, fast amortization, controls and stockpiling.

ATOMIC ENERGY — GAINING INDUSTRIAL MOMENTUM
Private industry participated more widely than ever in atomic power developments last year. As nuclear energy entered the hard sell era, management became increasingly aware of its problems, potentialities. Here's a report on industry's progress in the nuclear energy field, and some suggestions on how to find out more about it.

PRODUCTION PROCESSES — WHAT ARE THE TRENDS?
Where are we going in machining, joining, casting, stamping and forging, testing, materials handling, metallurgy, metal finishing, heat treating? Here, Iron Age editors take a close look at new methods, with an eye toward spotting important trends.

PLYMOUTH

1956 Plymouth Belvedere Four-Door Sedan

PUTS THE *FORWARD LOOK* IN METAL FINISHING

In the Plymouth Division's all new multi-million-dollar V-8 engine plant, where new concepts of quality control and manufacture have been incorporated, a Frederic B. Stevens, Inc., automatic "Little Steve" machine has been installed for tin immersion plating of pistons.

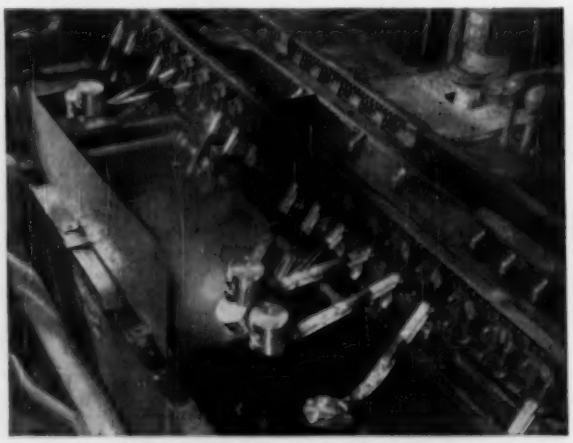
Plymouth's "Little Steve" is also equipped with automatic load and unload devices and can easily handle the production requirements of 1,600 pistons per hour. In fact, the Plymouth machine has been designed so that additional arms can be added at any time to increase the production rate.

"Little Steve" Pays Off

"Little Steve" is a recent development of Frederic B. Stevens, Inc. It is a space-saving, low-cost automatic plating and/or immersion processing machine using arms (as shown in the Plymouth installation) or racks which are placed on the arms. When racks of small parts are used it is capable of processing or plating up to 40,000 pieces per eight hour day.

The size of the "Little Steve" makes for easy installation in most plants. It offers no floor overload or ceiling height problems. Furthermore, it fits in most factory bays between structural members. Small over-all size and smaller tank size means low solution expense. The capital investment is low, too — low enough to enable many companies to now have their own automatic installation.

If you would like further information about "Little Steve" write today to Frederic B. Stevens, Inc., Detroit 16, Michigan, or call your local Stevens Sales Engineer.



"Little Steve" automatic machine for immersion tin plating at the new Plymouth V-8 engine plant.

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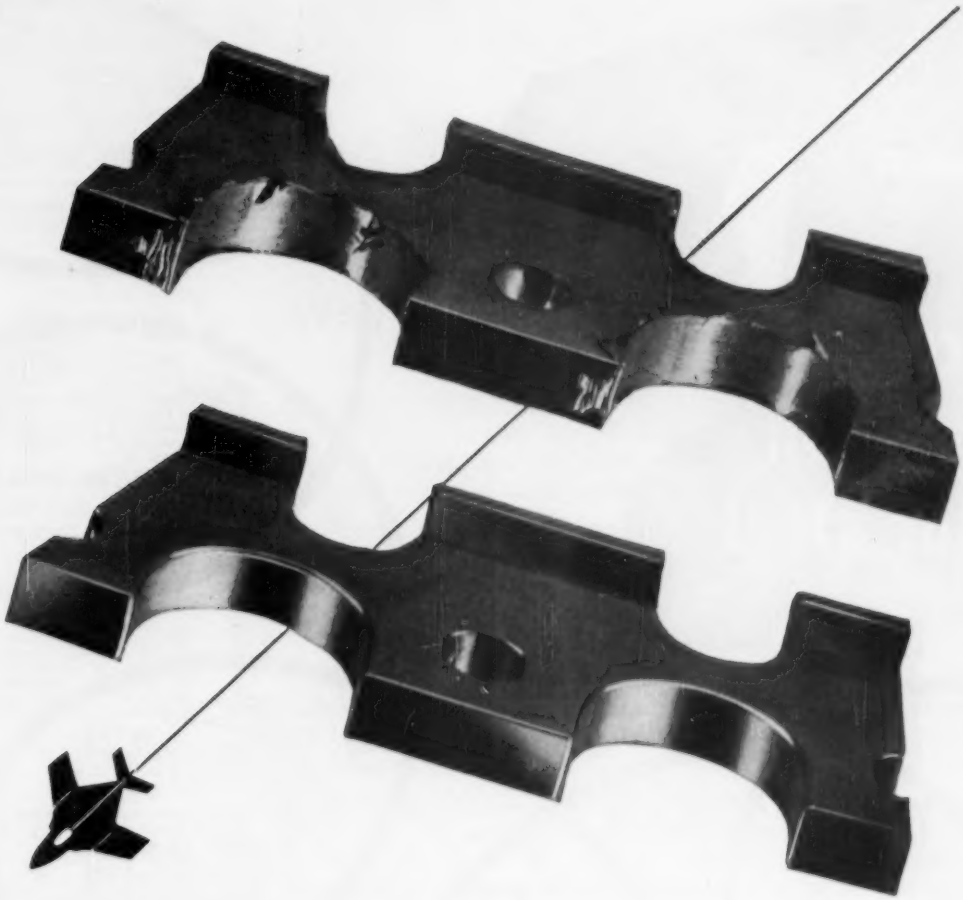

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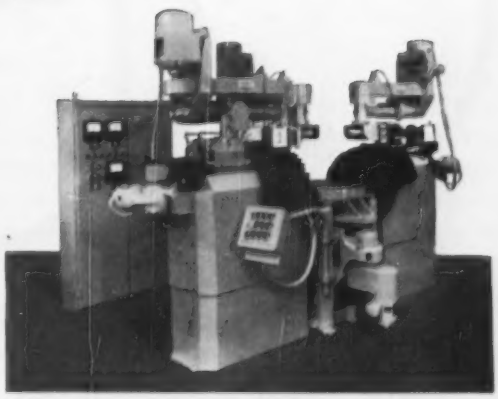

Osborn's 51-3L Brushamatic cleans and finishes metallic and non-metallic parts up to 8 feet in diameter, 3500 pounds in weight

COMPLETE DATA—For information on power brushes and brushing methods write today for Osborn's Catalog 300.

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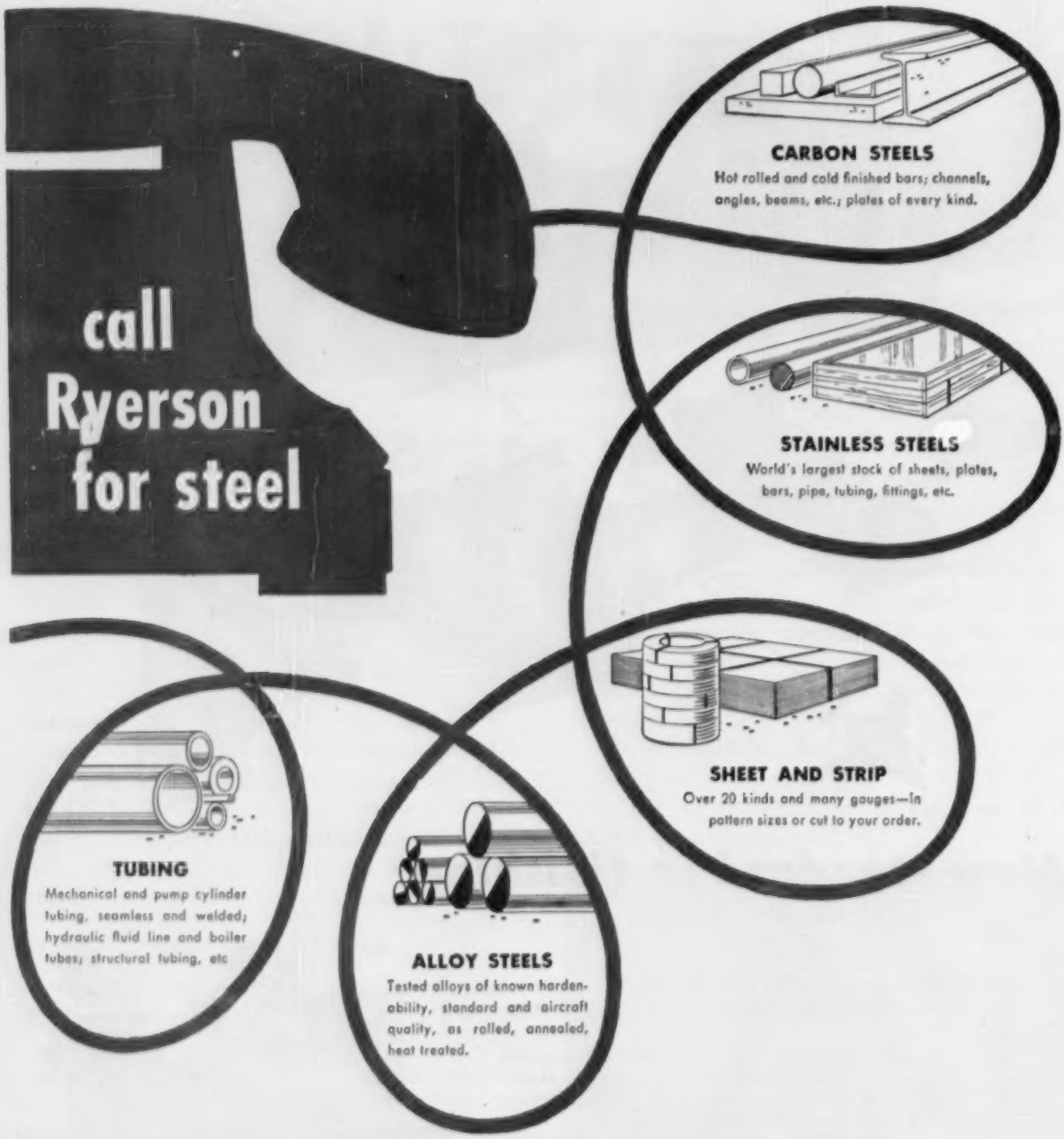
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BPA NBP

Editorial:

Will the Budget Be Balanced?

◆ UNLESS YOU ARE THE EXCEPTION, this is the time for all good men to become budget minded. Maybe the Christmas bills haven't started to roll in yet but they will. Now that we are all in the right frame of mind, what about the Big Budget—Uncle Sam's?

George M. Humphrey, Secretary of the Treasury, must pay attention to his private bills just like the rest of us. But he is paying a whole lot more attention to our country's bills—and receipts. Top priority with him is a balanced budget.

Mr. Humphrey has the old fashioned idea that if you can't match your outgo with your income (or vice versa) you are in for trouble sooner or later. He figures that if the United States can't make ends meet during one of the biggest business booms in its history, it probably never will be able to do so.

If it can't balance its budget, thinks Mr. Humphrey, then how can our country be considered a sound government—financially speaking that is. Because of accent on the budget, a lot of businessmen are wondering what the Secretary is going to do about tax cuts in 1956.

Defense spending has gone up faster than some experts thought. That poses a problem for the Treasury. Fortunately, surging business has brought in enough money to help out on this balancing act.

Mr. Humphrey is a cautious man when it comes to predicting future actions. He isn't saying yes and he isn't saying no on the probability of a tax cut. But one thing is sure: With the budget closer to a balance that it has been for years and years, the polite but fiscally blunt Secretary isn't going to embark on any give-away program which might endanger the goal he seeks.

Until the Treasury head sees the plus sign in front of his department's digits he will go slow in recommending any tax cuts. He needs all the revenue he can get between now and next June 30.

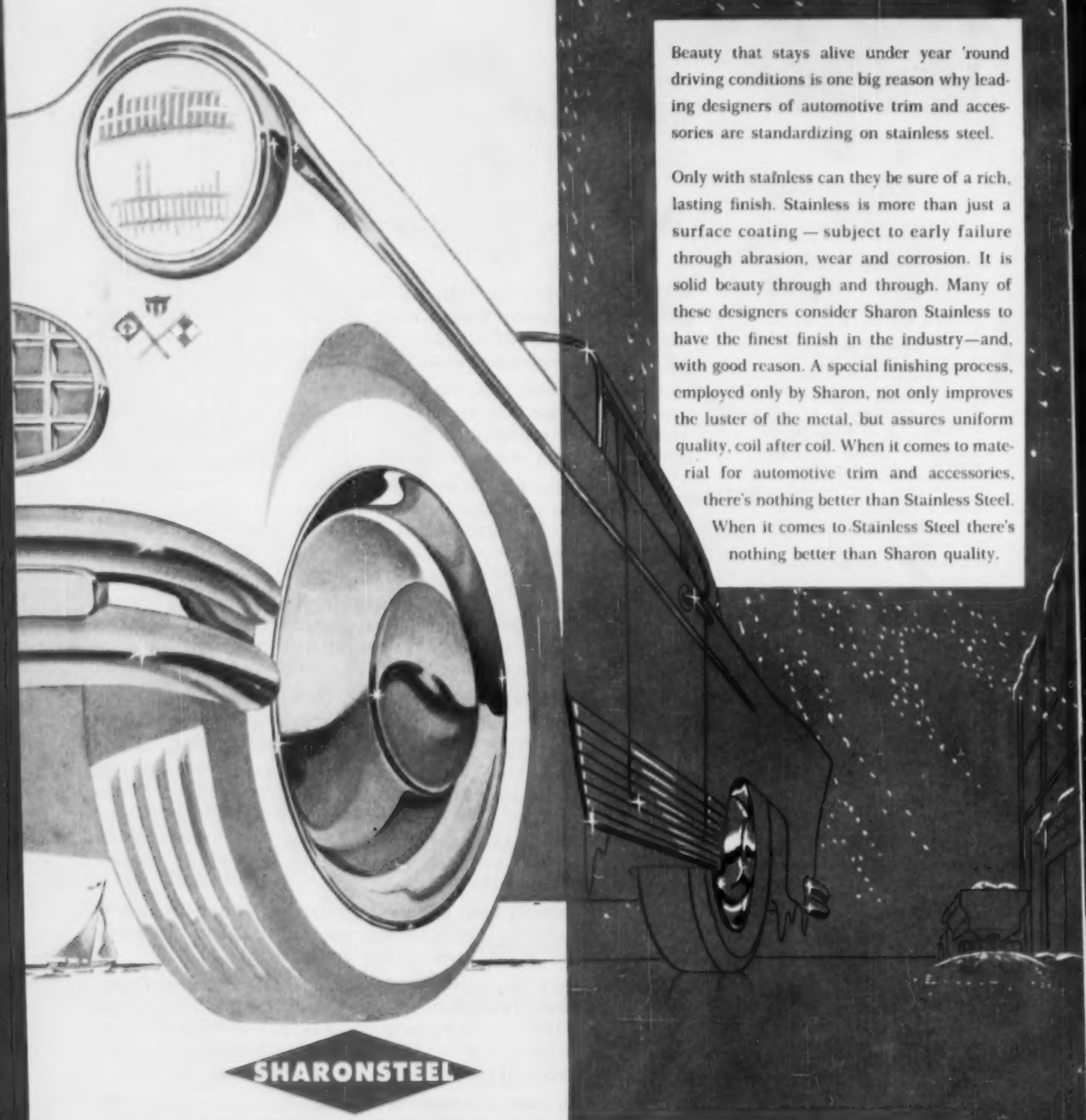
We figure that: The budget will be balanced; the present corporate tax rate (which is slated for reduction April 1) will be carried unchanged into 1957; excise taxes will change little if at all. If there is still a big question of a balanced budget, the Secretary may not countenance a recommendation for a general income tax cut.

But Mr. Humphrey is a resourceful man. He will probably come up with a balance in his figures just in time to give his blessing to a lower bracket tax cut.

Tom Campbell

EDITOR-IN-CHIEF

SHARON STAINLESS ASSURES LASTING BEAUTY



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dear editor:

letters from readers

Religion and Work

Sir:

It was certainly an encouraging experience to read IRON AGE, Oct. 27, 1955, p. 42, containing the conference report relative to the relationship of religion and work. You deserve congratulations for publishing the résumé. More articles of this type—based on similar meetings—would serve as a leaven. Perhaps the contagion would be great enough to make peace among all nations. *Patricia Snyder, Toledo, Ohio.*

Induction Welding

Sir:

In your Nov. 10, 1955 Induction Heating feature there is a short description on p. 127 of a tube welding mill intended for the range ½ to 2 in. and working with an output speed of 250 fpm.

In our French tube factories there are several mills using induction heating and we would like to know the name of the American firm which built this mill. We would also like to obtain the company's catalogues on this equipment. *R. Frumkin, Société Métallurgique De L'Aisne, Paris.*

For more information on this induction seam welding unit we suggest you write to Mr. Carl L. Ipsen, executive vice president, Industrial Heating Equipment Assn., Associations Building, Washington 6, D. C.—Ed.

Titanium Extrusion

Sir:

We would very much appreciate receiving two tear sheets or reprints of Part I and Part II of the article entitled "Titanium Extrusion—A New Fabricating Technique," appearing in your October 27 and November 3, 1955 issues. *R. John Hess, Lake Erie Engrg. Corp., Buffalo, N. Y.*

New Casting Machine

Sir:

On p. 37 of your Nov. 24 issue you carried a *Newsfront* item, "New Casting Machine Cuts Parts Costs."

This machine and its relation to permanent molding operation could be quite important to us at this particular time. Would you please let us know the name of the firm producing this machine so that we can contact them for its details? *J. C. Kemp, Badger Brass and Aluminum Foundry Co., Milwaukee.*

See p. 61 this issue.—Ed.

Torque Amplifiers

Sir:

In your Nov. 3 issue, reference is made to high efficiency for torque amplifiers combining the use of a torque amplifier unit with conventional gears. We would appreciate additional information regarding this subject. *G. A. Shimmin, Cone-Drive Gears Div., Michigan Tool Co., Detroit 12.*

Further information may be obtained by writing P. L. Forsburg, Westinghouse Electric Corp., Hydraulic Drives Dept., Pittsburgh, Pa.—Ed.

Tempering and Guesswork

Sir:

An item in the Dec. 1, 1955, issue of *Newsfront* mentions a new method to take the guesswork out of tempering temperature and time at temperature. Where may I obtain complete information on this subject? *H. D. Cronin, Morse Chain Co., Ithaca, N. Y.*

Further information may be obtained by contacting American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio, for ASM Preprint Nov. 12, 1955, "Hardness of Tempered Martensite in Carbon and Low Alloy Steels," by R. A. Grange and R. W. Baughman.—Ed.

HOW DOES GARRETT GIVE SUCH SERVICE?

What others may call impossible Garrett comes through as routine service. It seems as though they treat each order as the only one in their three plants. Everybody pitches in for service with the customer in mind.

If it is a stock item such as lock washers, flat washers, spring washers or hose clamps the order is usually on the way the same day. If it is stampings or assemblies Garrett engineers, production men and die makers team up to make their high-speed automatic equipment really hum . . . and your order is in your hands in half the time.

Want to be surprised by real service you can't beat? Next time send your order to Garrett for . . .

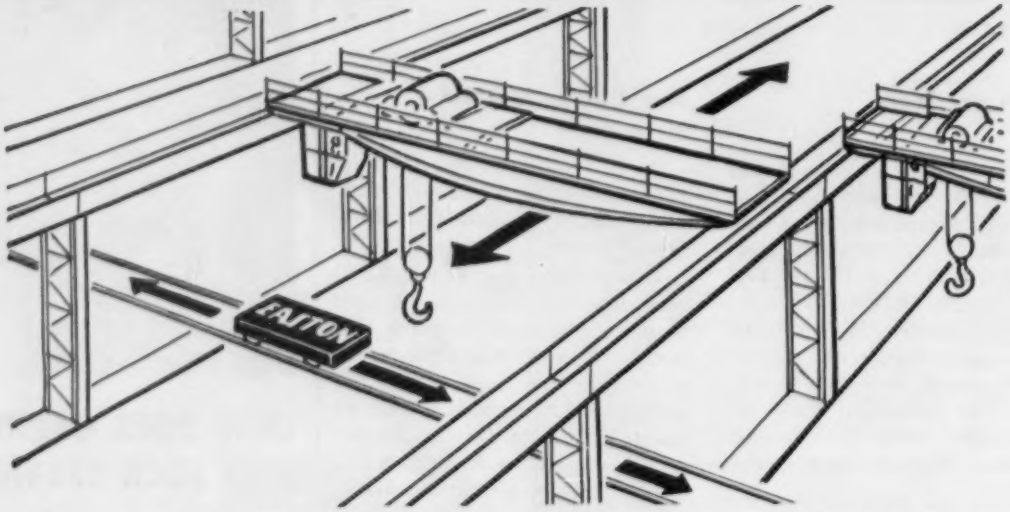
LOCK WASHERS
FLAT WASHERS
HOSE CLAMPS
SPRING WASHERS
STAMPINGS

Manufactured by

GEORGE K. GARRETT CO., Inc.
Philadelphia 34, Pa.

Garrett
OF PHILADELPHIA

USE YOUR IMAGINATION WITH
Cross-Bay® Transfer Cars



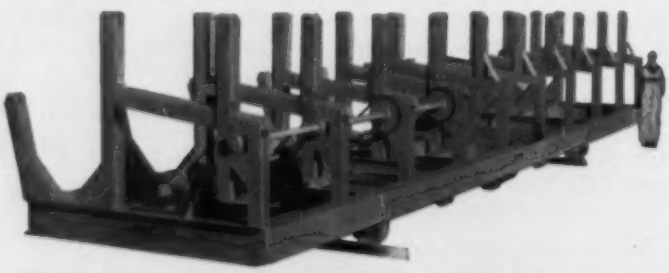
Infinitely variable application of EASTON motor-driven Cross-Bay Cars, together with the possibility of special super-structure design, provides full scope for imaginative planning in this growing era of automatic handling.

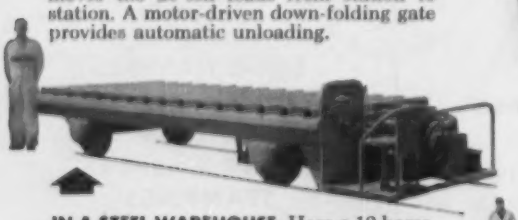
EASTON Cross-Bay Transfer Cars were originally introduced to supplement overhead crane service in modern parallel bay plants and for movement of materials between plant buildings, storage yards and shipping platforms. Operating men everywhere were quick to see the adaptability of the Cross-Bay idea to many other heavy handling and production problems.

EASTON Cross-Bay Cars, controls and special superstructures are custom-designed to meet individual requirements. Customers may specify electric motor, storage battery, gasoline-electric or gasoline-hydraulic power. Controls may be manual, electric (by push-button on the car or remote station) or electronic. EASTON Cross-Bay Cars can be built to capacities from 5 to 500 tons to fit any track gauge.

Investigate the EASTON Cross-Bay idea now for plant expansion and new plant programs.

IN A TUBE MILL. An interesting application of mechanized superstructure. Here several lengths of brass tubing are carried in a special superstructure on an EASTON Cross-Bay Car. The 2 horsepower electro-fluid drive, controlled from a walk-along push-button station on the side of the car, moves the 20-ton loads from station to station. A motor-driven down-folding gate provides automatic unloading.





IN A STEEL WAREHOUSE. Here a 12 horsepower gasoline-hydraulic EASTON Cross-Bay Car handles 25 ton loads of structural shapes in a steel warehouse. A comfortably seated driver operates the car at speeds up to 50 ft. per minute forward or reverse between plant buildings.

IN A STEEL MILL. Here a push-button control panel is attached by a 10 ft. cable to a 100-ton capacity 3 horsepower electro-fluid EASTON Cross-Bay Car. As the operator walks along the car follows carrying two 50 ton slabs of steel.

A-1047

OTHER EASTON CUSTOM-BUILT CARS FOR INDUSTRY

Annealing Furnace Cars	Motor Driven Cars	Scoop Cars
Coal Charging Cars	Newsprint Cars	Skip Cars
Core Oven Cars	Platform Cars	Steel Mill Cars
Gable Bottom Cars	Quarry Cars	Transfer Cars
Hopper Cars	Rack Cars	Transformer Cars
Mine Cars	Rocker Dump Cars	Turntables

FORTY-ONE YEARS OF DEPENDABLE SERVICE IN THE DESIGN AND MANUFACTURE OF INDUSTRIAL TRANSPORTATION EQUIPMENT

EASTON

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

fatigue cracks

by William M. Coffey

Letters

Dear Mr. Coffey:

O no you ain't! I doan want the job! I wooden no wot tew dew with all that thar money yew git down thar in Philly.

Back up boy! Be nice to that ole Scot Campbell. Doan horn in on territory that's his'n. Buy him some Ole Granpappy er somthin fer Xmas. Read that thar book—How ter make frens an influence peepul an, hoo nose, yew might get inter enuther tax bracket cum Micklemus.

Sincerely,
F. H. N. Carter
Vice President
Sunrod Mfg. Corp.
NYC

P. S. I see the Compressed Gas Assn. has a meetin in Jan. Air yew a'goin?

(Goin? We're president of the club. See ya there. Inkidentally, your speling is atrowcious. "Doan" is spelt "dont.")

* * *

Dear Sir:

Your puzzler on page 11 of the October 27 edition is credited to a Mr. C. Leo Jordan. Could you possibly mean Mr. A. Leo Jordan? If you have correctly identified him there must exist two unique characters by the name of Jordan who use the middle name of Leo as a natural expression of their indomitable nature.

Very truly yours,
V. M. Johnston
Appalachian Coals, Inc.
Cincinnati, Ohio

("We're pretty sure there are two such lions, but if either Mr. A. Leo or Mr. C. Leo would get in touch with Mr. W. Leo Coffey we'd straighten this thing out.)

* * *

This is a news release received from an advertising agency.

Memo to Editors:

You have recently received a release announcing the appointment of Herman VanDyke to manager of production control for the East Minneapolis Machine Tool Corporation, with his post to be filled by John W. Rose.

If you plan to use this story the following corrections should be made:

1. The name and initials of R. A. Robb, president of the firm, are incorrect. They should read H. A. Robb.

2. Mr. Rose was connected with the Budd Company, not the Budd Motor Company.

3. For correct usage, bailers should be spelled balers.

(Names are slightly altered to protect the innocent.)

Puzzlers

We sort of took for granted that the width of the boards in the acreage puzzler (Nov. 24) was 1 ft. If you did too, then your answer should have been 92,160 acres. If you didn't, then your answer should be 92,160 divided by the width of the boards in feet squared. (When we're in a spot we always lean on C. W. McKinley who pointed this out to us.) If you figured the boards were 4 ft boards, then the answer would be 5,760. Winners: Mr. McKinley; Abe Raich, Colorado Fuel and Iron Corp.; Charles Spencer, Gisholt Machine Co.; W. C. Andrews, Plymouth Foundry and Machine Co.; and Charlsie's Club.

New Puzzler

Shall we start the year with a tough one? The reciprocals (1/P) of certain numbers (P) are in th form of series of decimals which repeat after P-1 digits, and may be multiplied by any digit from 2 thru P-1 and still retain the same series of repeating digits, but starting in another position.

Mr. J. C. Severn wants to know how far you can extend the series, starting with 7-17-19-23-29-47-59-61-97-. Get to work, Mr. McKinley.

now you can produce
trouble-free,

FREE-MACHINING STEEL
with
FOOTE MANGANESE SULPHIDE

This fume-free ladle additive increases quality and reduces the cost of producing high sulphur, free-machining steels . . . with these plus advantages:

1. *improved hot rolling behavior*
2. *fewer surface defects*
3. *fewer diversions*
4. *lower conditioning costs*
5. *low carbon content saves heat time*

TYPICAL ANALYSIS

Manganese	53%
Sulphur	32%
Carbon	.22%

Size: 1" x 5" lump

write for further details!

Foote MINERAL COMPANY

438 Eighteen W. Chelten Bldg.
Philadelphia 44, Pa.

right in tune

...and REX is the standard by which all other high speed steels are compared

A tuning fork sounds the *standard pitch* to which musical instruments are compared. There's a recognized standard for high speed steels, too – Crucible REX®.

But don't take our word for it. Try REX in your own shop. Compare its structure, finish, hardenability, carbide distribution and general uniformity. Measure the *extra performance* you get. You'll see for yourself why no other tool steel outperforms REX . . . why it's the *standard for comparison* wherever high speed steels are used.

Next time you buy tool steels, be sure of top performance – specify REX. Remember, it's made only by Crucible – and is available from local warehouse stocks, or by prompt mill delivery. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

dates to remember

JANUARY

INSTITUTE OF SCRAP IRON & STEEL, INC.—Annual convention, Jan. 3-6, Hotel Sherman, Chicago. Society headquarters, 1729 H St., N.W., Washington, D. C.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC.—Annual meeting, Jan. 9-13, The Sheraton-Cadillac Hotel and Hotel Statler, Detroit. Society headquarters, 29 W. 39th St., New York.

AMERICAN ROAD BUILDERS' ASSN.—54th annual convention, Jan. 11-14, Miami Beach, Fla. Assn. headquarters, World Center Bldg., Wash. 6, D. C.

EXPOSITIONS

1956

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

STEEL SHIPPING CONTAINER INSTITUTE, INC.—Winter meeting, Jan. 18-19, Hampshire House, New York City. Society headquarters, 600 Fifth Ave., New York City.

COMPRESSED GAS ASSN., INC.—Annual meeting, Jan. 23-24, The Waldorf-Astoria, New York. Society headquarters, 11 W. 42nd St., New York.

INDUSTRIAL HEATING EQUIPMENT ASSN., INC.—Annual meeting, Jan. 23-24, LaSalle Hotel, Chicago. Assn. headquarters, 155 E. 44th St., New York.

TRUCK-TRAILER MANUFACTURERS ASSN.—15th annual convention, Jan. 23-25, Edgewater Gulf Hotel, Edgewater Park, Miss. Assn. headquarters, 1042 National Press Bldg., Washington, D. C.

PLANT MAINTENANCE & ENGINEERING SHOW—7th annual conference, Jan. 23-26, Convention Hall, Philadelphia. Society headquarters, Clapp & Polick, Inc., 341 Madison Ave., New York.

NATIONAL RURAL ELECTRICAL COOPERATIVE ASSN. — 14th annual meeting, Jan. 23-26, St. Louis, Mo. Assn. headquarters, 155 E. 44th St., New York City.

AMERICAN STANDARDS ASSN.—Gaillard Seminar on industrial standardization, Jan. 23-27, New York City. Assn. headquarters, 70 E. 45th St., New York.

ENGINEERS JOINT COUNCIL—Second annual general assembly, Jan. 26-27, Hotel Statler, New York City. Society headquarters, 29 W. 39th St., New York.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Winter general meeting, Jan. 30-Feb. 3, Hotel Statler, New York. Society headquarters, 26 W. 46th Street, New York City.

For the vital links in your

call in STANDARD conveyor

Up-to-the-minute conveyor planning between automatic machines and control points is essential to gain the full benefits of automation. Your needs in conveyors — ranging from engineered systems of power and gravity types to single units — can be met by Standard. Nearly 50 years of "package" conveyor application experience is available to you. Our engineers can choose from roller, belt, slat, chain, wheel, push-bar conveyors, spiral chutes and pneumatic tube systems, plus special portable types.

If you have plans of *any kind* — adding to present facilities or completely modernizing with a new conveyor system — write and tell us what you make or convey. Or call your Standard representative listed in your classified phone book. Send for General Catalog — address Dept. IA-125.

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul 9, Minnesota
Sales and Service in Principal Cities

GRAVITY & POWER Conveyors
ROLLER • SLAT • WHEEL
SECTIONAL • BELT • CHAIN • PUSH-BAR
PORTABLE CONVEYOR UNITS:
HANDIBELT • INCLINEBELT • EXTENDOVEYOR • UTILITY BELT-VEYOR
HANDIPILER • LEVEL BELT • LITEWATE • HANDIDRIVE
PNEUMATIC TUBE SYSTEMS

GOOD HOUSEKEEPING MAY REQUIRE ADDITIONAL PLANT FACILITIES. Republic's Truscon Division can supply you with those facilities in a standard steel building. Illustrated is one of many types and sizes produced by the world's largest manufacturers of metal building products. Truscon steel buildings offer the economies of standardization—plus fire protection, ease and speed of erection, low upkeep, high investment value. They're low in cost and additions can be made easily and economically as space needs change.

This is good

HOW REPUBLIC MATERIALS HANDLING

GOOD HOUSEKEEPING CAN ALSO BUILD GOOD EMPLOYEE RELATIONS. For example, modern steel lockers that conserve space and still provide clean, safe storage for employees' clothing and valuables are made by Republic's Berger Division. Illustrated is the Republic "Space-saver" two-person locker. It provides separate compartments for two people in no more floor area than that required for one large single-tier locker. Berger offers a complete locker planning, engineering and installation service.

REPUBLIC STEEL CORPORATION
3104 East 45th Street
Cleveland 27, Ohio

Please send more information on:

☐ Republic Boxes and Skids ☐ Truscon Steel Buildings
☐ Berger Wedge-Lock Steel Shelving ☐ Berger Lockers

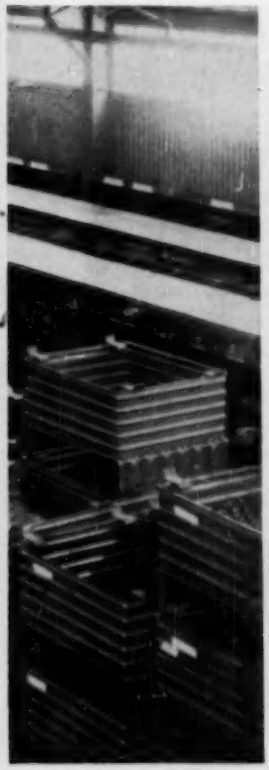
Name_____ Title_____

Company_____

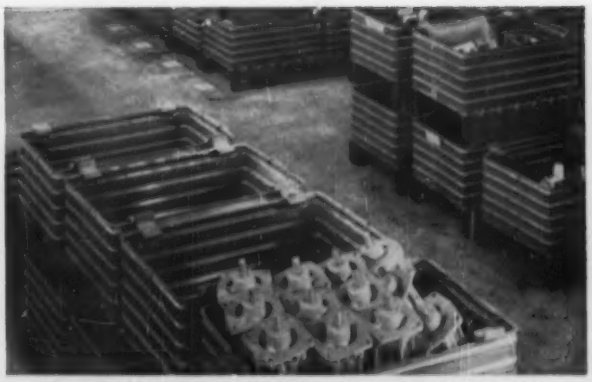
Address_____

City_____ Zone____ State_____

K-6076



PB-120-T BOX AND SKID UNITS used by Chiksan Company are equipped with welded tiering lugs which permit tiering to any practical height. Units are easily lifted and rapidly trucked to any point on the production line or in the warehouse.



WEDGE-LOCK STEEL SHELVING made by Republic's Berger Division assists Chiksan greatly in keeping more accurate records, uses less space and provides easy visible identification of parts. It is specifically designed for high stacking of enormous weights. Completely flexible, it assembles quickly and easily.

housekeeping . . .

EQUIPMENT SAVED SPACE AND REDUCED HANDLING COSTS 25%

The above photos were taken in the Brea, California, plant of the Chiksan Company, makers of ball-bearing swivel joints. They have been using Republic Materials Handling Equipment for about eighteen months for both raw and finished materials.

Here are the results in the words of the Manager of Production and Material Control:

"Our experience is that much less space is required for storage of raw forgings and castings—which allows for better housekeeping and reduces handling costs 25%.

Inventories are much simpler and more accurate. Substantial time saving is realized.

Finished products are stored in both stack-type steel boxes and steel shelving. They assist greatly in keeping more accurate records, use less storage space and provide visible identification. We are able to do a better job with one less employee in the warehouse and to do good housekeeping with less effort.

The installation of these products was a wise and profitable investment."

Chiksan should enjoy future benefits as well. Maintenance costs should be reduced because construction features of all Republic Materials Handling Equipment assure long, efficient service at lowest per-year cost.

The PB-120-T Box and Skid Units illustrated on these pages are only one of many types manufactured by Republic's Pressed Steel Division. There is a wide range of sizes from which to choose. Or if you have a special handling problem, Republic engineers are available to help you design a unit to meet your specific requirements. Your Republic Materials Handling Equipment Dealer has all the facts. Or write us for more information.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

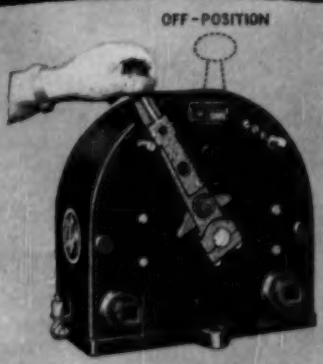
HEAVY LOADS SPOTTED QUICKLY, SAFELY

Here's Where EC&M CONTROL Gives Unexcelled Results

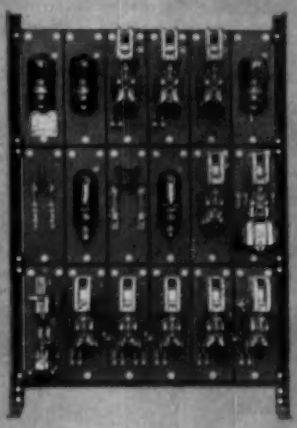
The EC&M Wright Dynamic Lowering Circuit Controller for crane-hoists is well known for its ability to permit accurate, short movements when spotting a load. The operator has complete control of all lowering speed-points. In setting the cope with this 125-ton crane, quick response through fast brake release enables the operator to close the mold carefully—with a minimum number of movements which maintenance men recognize as a contributing factor to reduced up-keep. The Wright Circuit is safe—specify EC&M Crane Control.

WRITE FOR BULLETIN 921

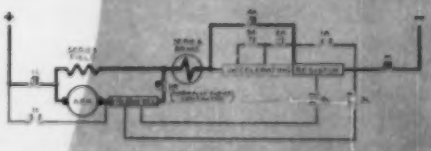
Photo—Courtesy, Cleveland Crane & Engineering



Speed-control Master Switches have short throw—narrow width—and are convenient for the operator to use.



The Wright Dynamic Lowering Circuit Controller (with protection) for crane-hoists.



First point lowering connections put all the current from the line through the brake for fast release.

THE ELECTRIC CONTROLLER & MFG. CO.
4498 LEE ROAD • CLEVELAND 28, OHIO

A SHORT CUT TO A FINISHED PRODUCT

SAVE YOURSELF TIME AND TOOL CHARGES

with Anaconda multiple-plunger press products—in a wide choice of metals

If you need parts like these in quantity, The American Brass Company can save you time and money. Through its specialized experience—and thousands of stock tools—it may save tool charges, too.

Ferrules, grommets, eyelets, deep-drawn cups and shells, and thousands of other intricate, close-tolerance parts made from strip metal are everyday business. American Brass Company design engineers and toolmakers have earned an enviable reputation for cutting costs and performing the almost impossible in design and production.

Your choice of metal: Such fabricated products can be furnished in copper, brass, bronze, nickel silver, nickel, iron, steel, stainless steel, and aluminum – in a wide variety of finishes.

Standard products: For a selection of more than 1000 eyelets of common sizes and styles, as well as eyelets kept in stock for immediate shipment, write for Catalog BG-1.

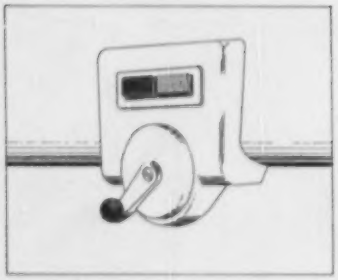
Special products: Just send a sample, drawing, or description, together with the quantity you need, the metal to be used, and other pertinent information. Address: The American Brass Company, Waterbury Brass Goods Division, Waterbury 20, Conn.

ANACONDA®
MULTIPLE-PLUNGER PRESS PRODUCTS

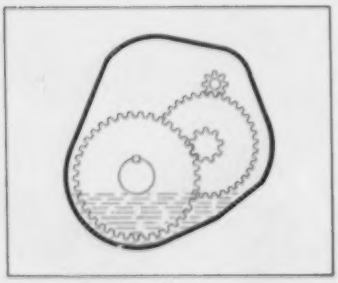
2 New CINCINNATI PRESS BRAKES

THIRTY TON - - - - - 2-30 SERIES
FIFTY TON - - - - - 3-50 SERIES

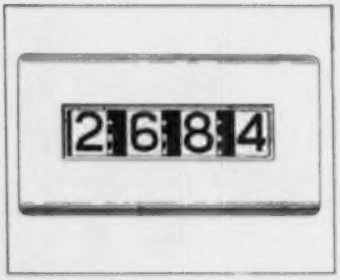
COMPETITIVELY PRICED



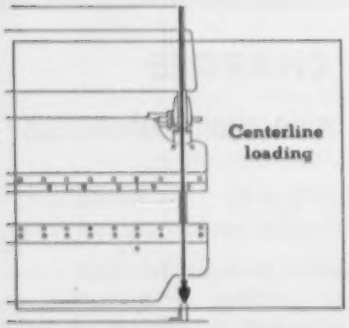
Front controlled, variable speed drive, 20 to 80 strokes per minute.



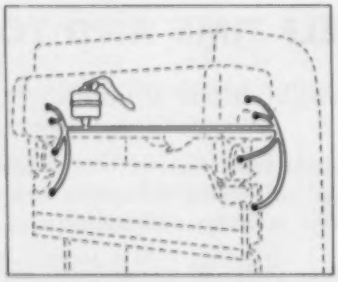
Completely enclosed transmission, running in oil.



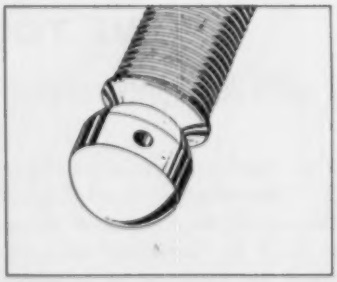
Two micrometer indicators, one at each end of the ram—easy to read and accurately record the amount of adjustment and tilt.



Centerline loading prevents weaving of the housings and insures accurate bends.



Centralized pressure lubrication system.



Ball end on the ram adjusting screws permits tapering of the ram for fade-out work.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

2-30 SERIES

This new 2-30 Series Cincinnati All Steel Press Brake has a capacity of 14 gauge x 6′ mild steel.

Look at these unusual standard features:

2½″ stroke—12″ shut height—9″ throat.

Distance between housings 5′-2″—overall die surface, 6′-0″.

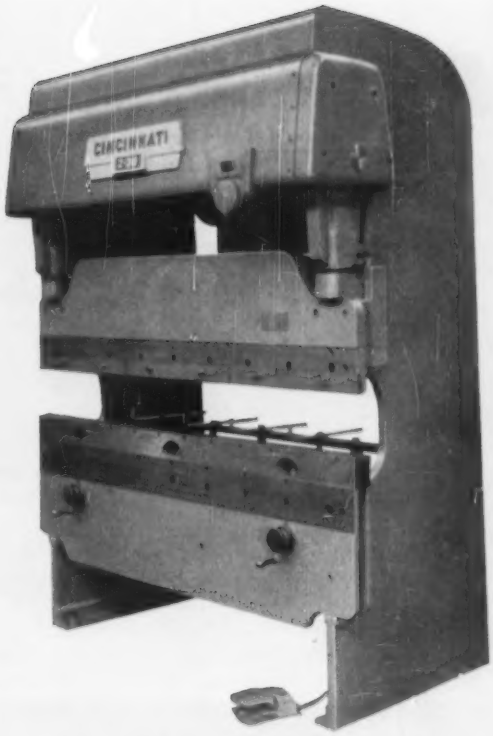
Front controlled, variable speed drive, 20 to 50 SPM. 4″ manual ram adjustment including ram tapering adjustment for fade-out work (power adjustment available as extra feature).

Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.



3-50 SERIES

These new 3-50 Series Cincinnati All Steel Press Brakes are built in two lengths and have a capacity of 10 gauge x 6′ mild steel. Investigate these unusual standard features: 3″ stroke—12″ shut height—12″ throat—distance between housings 6′-6″ or 10′-6″—overall die surface 8′-0″ or 12′-0″—front controlled, variable speed drive, 20 to 50 SPM.

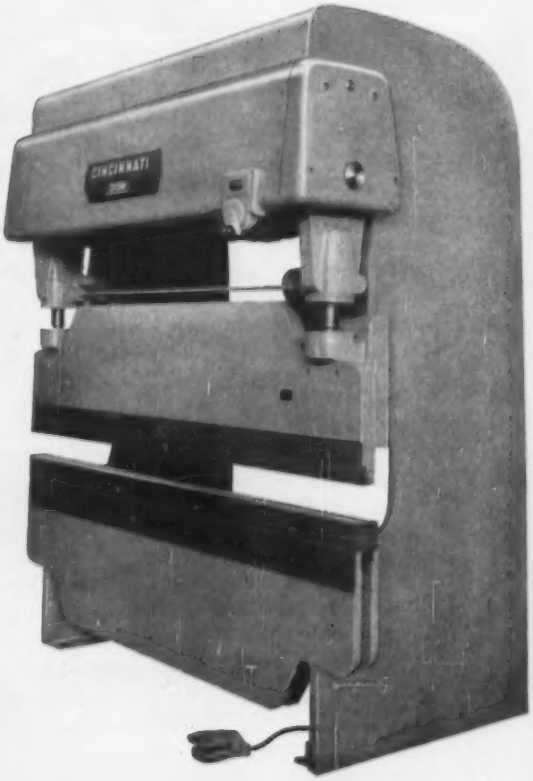
5″ motorized ram adjustment, including ram motor and control, complete with ram tapering adjustment for fade-out work.

Bronze swivel end-guide bearing for accurate endwise alignment, even when tilting ram.

Brushless electro-magnetic brake and clutch.

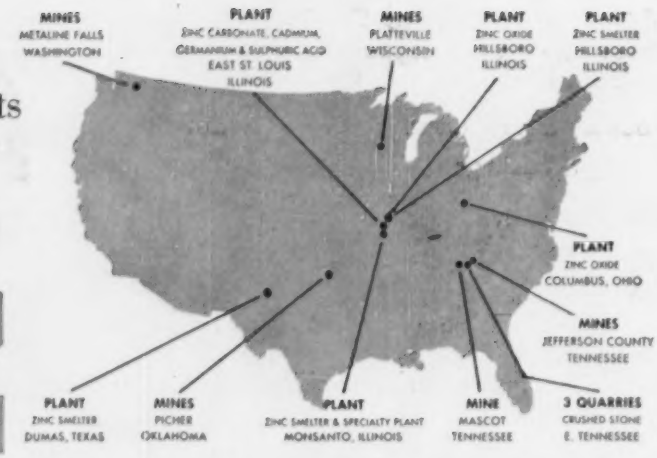
Deep bed and ram, planed and drilled for 5¾″ angles.

Micrometer indicators on both ends of ram for fast, accurate setting.



American Zinc and its products

from A *to* Z



FORT SMITH, ARKANSAS, PLANT OPERATES UNDER CONTRACT WITH AMERICAN ZINC

Zinc smelter, owned and operated by the Athletic Mining and Smelting Company, produces Prime Western slab zinc for American Zinc exclusively. Plant has roasting and nodulizing equipment, as well as horizontal retort furnaces. For complete picture of American Zinc's own operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

Distributors for

American Zinc sales Company

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

The Iron Age Newsfront

Telltale Signs Of Dropping Sales

Further indications that 1956 cars are not selling well can be seen in the cutbacks in production schedules for the first quarter. Original estimates of 2,370,000 units were dropped to 2,050,000—a little less than 15 pct. Part of reason: GM Senate hearings, making automakers hesitant about pushing more cars on reluctant dealers while heat's on in Washington.

Glass Molds Improve Casting Practice

Use of glass molds has been developed to a point where metal pouring temperatures as high as 3200°F are feasible. Special advantages claimed are blemish-free casting surfaces with a 40 microinch finish or better. Mold material does not react chemically with the metals poured and permits close control over casting dimensions and grain size.

Forecast Heavy Electronic Tube Buying

Accent on guided missiles will keep military demand for electronic vacuum tubes at a high point. Army and Air Force buyers are out for four million tubes this year in more than 280 separate types. Purchase lots will range from less than two dozen to 300,000.

May Overcome Steel Mill Bottleneck

A new materials handling truck may soon alleviate the loading of long cut length sheets into railroad cars. It hauls bundles into the car, then slides them off against a wall or stacks them one on another. They are now loading by skids or rollers and sometime by a large "wiggle-tail" truck.

Plant Beats High Power Peak Costs

A large steel mill with no in-plant generation to absorb expensive power peaks used 400,000 kw more power, yet paid $3000 less than previous month's bill. This was done using load controls which integrate demand on a 15-minute basis by cutting back power to melting rather than refining furnaces when demand creeps too high.

Stockpile May Affect Soft Coal Market

Stockpile rebuilding should definitely be a factor in the 1956 soft coal marketing picture. At year's end, production will hit 470 million tons, about 20 million tons over earlier estimates. The industry will start 1956 with about a 55-day supply for all uses, a reduction of almost 20 pct since the first of August.

One Way To Lick Shortage Of Engineers

Lack of engineers has stepped up the use of electronic computer equipment by American Bridge. Calculations for the new Mackinac Bridge saved about 10,000 hours of valuable engineering time.

Pinch On For More Soaking Pit Capacity

Rising customer demand for hot top quality steels is putting the pinch on soaking pit capacity, in some cases more so than during the Korean campaign, for the shell program. The net result is that some ingot capacity expansion must take a back seat to soaking pit expansion. And the demand from civilian buyers is still growing.

Rapid Growth For Plastics Industry

Per family purchases of plastic products in U. S. have jumped from 9 lb in 1940 to 83 lb in 1955. At the present rate of climb, it should reach 152 lb by 1960. The industry has just about reached the $2 billion sales mark with estimates placing it around $4 billion in another five years.

Ford Share Estimated At $14 Million

If all eligible employees take parts in the Ford stock option and savings program, company contributions to the plan at the present rate will total $14 million annually. Ford has made arrangements for 100,000 shares to start the program rolling. Future purchases will be made from the Ford Foundation.

MIDVALE FORGES STAINLESS STEEL

Official U.S. Navy Photograph

To Harness Atomic Power Underseas

In planning atomic-powered submarines, top-grade materials and top-quality workmanship were first considerations throughout.

Midvale is proud to have supplied the stainless steel forgings used in the heat exchanger system of the power reactor . . . proud because of the recognition thus given to Midvale quality . . . in steel making, in forging, and subsequent heat treatment, inspection and testing.

These forgings of type 347 stainless steel required the most careful control in the melting and casting of the ingots, together with the best in forging technique to produce material that would pass all of the exacting metallurgical requirements. The 100% Zyglo inspection, inside and out, was only part of the specifications. All forgings were fabricated by welding into the piping system and heat exchanger.

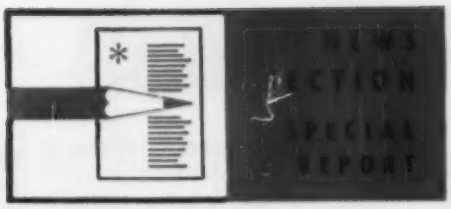
It will pay you, too, to call Midvale for any forging . . . carbon, alloy or stainless steel . . . any shape — rolls, gear rings, shafts, pressure vessels or a variety of other steel products.

THE MIDVALE COMPANY - Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, FLANGES, CORROSION AND HEAT RESISTING CASTINGS



Free World Widens Steel Lead Over Reds

Nations of Free World boost output 22.5 pct . . . Reds gain only 10 pct increase . . . Survey shows Free World poured 223 million tons of steel in 1955, Reds only 68 million—*By J. B. Delaney.*

◆ FREE WORLD steel production made a stronger comeback in '55 than the bloc of nations behind the Iron and Bamboo curtains.

A survey of world steel output this year shows that the free nations of Europe, Asia, and the United States boosted their production by 22.5 pct over 1954, compared with an increase of 10.5 pct by Russia and Red-dominated-or-influenced countries.

Let by the U. S., where production skyrocketed by approximately 32 pct under the impetus of the biggest economic boom in history, the Free World poured 223 million tons of ingots in '55, compared with 182 million the previous year.

USSR Gain Small

Red nations produced 68 million tons in '55, as against approximately 62 million tons in '54.

Significantly, estimated Russian output this year is 49.6 million tons, compared with 45.2 million tons in '54, an increase of only 10 pct.

As a whole, the free nations outproduced the Red bloc by more than 3-to-1 this year, compared with a slightly less than 3-to-1 margin last year.

Total world output in '55 is estimated at 293 million tons, as against 245 million tons in '54, an increase of 48 million tons. Of this increase, the U. S. accounted for approximately 28.2 million tons, or 59 pct.

Meanwhile, a report by a team of British experts indicates that the Russian steel industry is becoming increasingly automation-minded. Confronted with a manpower shortage after the war, particularly in the skilled classifications, the Russians turned to automatic equipment to offset this shortcoming.

The trend toward automation in Russian steel was apparent even before the war, and the trend has been accelerated. Automatic controls and equipment were evident in blast furnace and open hearth shops, but especially in blooming and continuous mill departments.

More Oxygen Process

Russian metallurgists are working on problems similar to those undertaken in the U. S. Current interest in the use of oxygen-enriched blast is shared by the Reds, and an experimental blast furnace was to be built under the fourth Five-Year Plan to probe the basic problems of producing ferro-alloys and pig iron by using oxygen-enriched blast.

Russian researchers also are devoting considerable time to development of a process to produce steel directly from ore. They're looking into continuous casting.

FREE NATIONS

	1955*	1954[1]
Australia	2,430	2,117
Austria	1,940	1,822
Belgium	6,270	5,522
Brazil	1,210	1,288
Canada	4,150	3,192
France	13,670	11,319
W. Germany	23,155	19,221
India	1,935	1,882
Italy	5,885	4,638
Japan	9,095	8,523
Luxembourg	3,505	3,118
Mexico	530	515
Netherlands	1,070	1,023
Saar	3,465	3,093
S. Africa	1,660	1,523
Spain	1,435	1,209
Sweden	2,205	2,052
U. K.	22,120	20,742
U. S.	116,500	88,312
Yugoslavia	680	679
Total	223,110	181,790

IRON CURTAIN

	1955*	1954[1]
China	2,755	2,397
Czechoslovakia	5,525	4,884
E. Germany	2,755	2,486
Hungary	1,600	1,644
Poland	5,070	4,370
Rumania	860	693
U.S.S.R.	49,625	45,203
Total	68,190	61,677

(thousands of net tons)

*Estimated [1]Revised

	1955*	1954[1]
Others	1,700	1,546
Grand Total	293,000	245,013

U. S. Versus Russia—The Box Score

(Steel Output—Net Tons (000)

Year	U. S.	RUSSIA	Year	U. S.	RUSSIA
1944	89,642	13,300	1950	96,836	29,800
1945	79,702	12,300	1951	105,200	34,500
1946	66,603	13,400	1952	93,168	36,029
1947	84,894	14,700	1953	111,610	41,800
1948	88,894	18,700	1954	88,312	45,203
1949	77,978	23,600	1955*	116,500*	49,625*

*) estimated

which they have already installed in at least five special steel plants. Research work also is going on in the field of plastic deformation of steel, "since this has a direct bearing on the possibility of increasing the efficiency of rolling."

From a steel production standpoint, the Russians are moving toward use of larger furnaces, as in the U. S. Standard equipment of modern Russian steel plants is the furnace of 180 to 220 tons capacity, but furnaces of 300 and 370 tons capacity are now in operation. It's also reported that two furnaces of 500 tons are under construction, one of them in the Ukraine. It's believed the Russians now have more than 30 furnaces of over 300 tons capacity.

Red Goal

Russian steel production, approximately 50 million tons this year, is expected to rise to 66 million tons in 1960.

The British experts believe that Russia must spend heavily on mill developments, particularly continuous strip mills, where, in relation to the size of their steel industry, they are behind in development. They have an objective of 40-45 pct of their total steel output in the form of flat products by 1960.

Red Ore Plentiful

According to the British report, Russia reportedly is constructing 2 continuous strip mills, one of about 90 inches in width, and one cold reduction mill. The cold mill is slated for the Magnitogorsk Works. These three mills will be the first of their type ever constructed by the Russians, but they are not likely to be in operation for some time.

Main raw material advantage of the Russian steel industry is the abundance and relatively low cost of its iron ore, although increasing attention is being paid to the use and preparation of lower grade ores.

At Krivoi Rog, the great iron ore center of the Ukraine, the 55 pct ore is declining as a proportion of total output and the concentration and sintering of 36 pct ore is being developed. After beneficiation, this lean ore is upgraded to 60 pct Fe.

In order to attract labor, pay rates in Russian steel are higher than in other industries, and they are 20 pct higher in eastern than in western Russia. However, trade unions play only a minor role, if any at all, in collective bargaining. Wage rates are determined by the state.

Where Europe's Steel Is Going

	European Coal & Steel Community	Russia	Red Satellites
Construction	21.4	17.2	29.3
Automobiles	6.9	2.8	2.7
Railroads	5.1	17.3	8.5
Containers	3.4	2.2	3.1
Machinery, tools	11.7	10.3	11.4
Oil, gas industries	1.4	3.5	0.8
Agriculture	2.6	3.2	7.3
Armament	2.9	8.3	15.2
Shipyards, all other domestic consumers	11.7	20.7	8.5
Exports	33.9	14.5	13.2

* First half 1955 estimate

Reds:

U. S. exports to Soviet bloc take third quarter dip.

Exports from the United States to Communist countries are leveling off or dwindling, while shipments from the Red bloc to the U. S. are rising.

Latest government figures show that actual exports to the Reds, as well as licenses for future shipments, dipped in the third quarter.

Shipments of American goods to the Soviet bloc in the third quarter were down to $1 million from $2 million in the second quarter. First quarter exports to the Reds amounted to $1.5 million.

Reds Ship More

Export license approvals in the third quarter dropped to $2.7 million, a drop of almost $2 million from the second quarter. The third quarter licensing, however, is still more than twice as high as the similar period in 1954.

U. S. imports from the Soviet Union and its satellites reached $16 million in the third quarter, up about $5 million from the previous three months and about $3.5 million over the first quarter of the year,

SCRAP: The Inside Story on Exports

Luria president sees no easing in export market . . . Opposes controls on exports . . . Many headaches lie ahead for new entries to the export field . . . Red tape, details are numerous.

◆ RALPH ABLON, president of Luria Brothers Div., Ogden Corp., lit a cigarette. The question: Will export demand for iron and steel scrap ease enough to take the pressure off domestic supply and prices?

"There's no sign that export demand will slacken," he said. "We are faced with a world-wide shortage of metallics. Scrap export prices are high, and foreign consumers are buying no more than they need. The United States is their best source of supply."

Some sources say the export market has reached the point where price is no object.

Press for Controls

Under the circumstances, U. S. steel producers can be expected to press for more stringent control of scrap exports, says Mr. Ablon, who believes they are sincerely concerned over possible depletion of a raw material essential to national security. He also shares their fears over the inflationary effects of higher prices.

At the same time, he would rather rely on supply and demand to call the turn on scrap prices rather than export restrictions which he says would have the effect of price regulation.

"No one wants Government control," he adds. "Least of all, the steel industry. That's what regulation of scrap exports would be."

Export Procedure

The booming export market is a tempting plum to many scrap people who have up to now left that end of the business to the experts. The more the merrier, says Mr. Ablon, but he points out that exporting a shipload of scrap involves many a pitfall and an abundance of frustrations.

For those who want to take a flyer, here are a few of the many details involved, as outlined by Mr. Ablon:

First, get a bona fide order from a foreign consumer. Second, have him send you an import certificate from the country of destination, guaranteeing that the scrap will be consumed in the country it goes to. This is a safeguard against transshipment of the material behind the Iron Curtain.

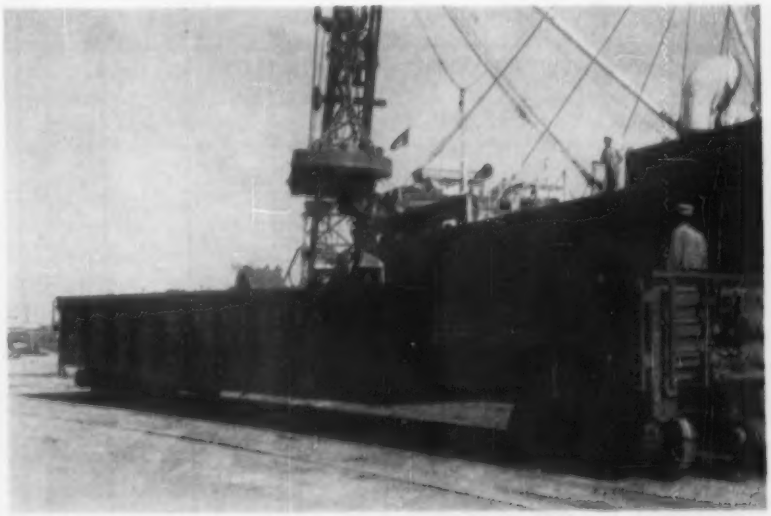
Third comes the letter of credit or other guarantee of payment. Fourth, a license from the U. S. to export. An export license can be obtained without a letter of credit or other guarantee, but it cannot be had without an import certificate.

Next, charter a boat. Average time of loading: about 3 weeks, or 12 "weather-working" days, Sundays and holidays excepted. Finally, the boat sails. Sailing time from the East Coast to Europe and the West Coast to Japan is 2 weeks; from the Gulf to Europe or Japan, 20 days. Unloading at destination and transport to the consuming mill takes another 2 weeks.

Multiple Problems

A few in-between problems include those of coordinating shipments to the dock (most cargoes contain scrap from as many as 25 different sources), inspection at the boat, proper stowage to avoid waste of valuable cargo space, possible necessity of overtime pay to well-paid stevedores, avoidance of ship demurrage ($1500 a day), and railroad demurrage.

Meanwhile, a careful draft statement (boat displacement) and an accurate cargo plan must be forwarded ahead of the boat to facilitate unloading (as many as 10 different consumers may be involved in one Liberty shipload of pproximately 9200 tons).



HEAVY SCRAP exports in 1955 were an important factor in skyrocketing domestic scrap prices. Dockside loading scene is at East Coast port.

EXPANSION

STEEL: Expansion Moves West

U. S. Steel three-year project places emphasis on mid and far west facilities . . . Goal is additional 2.5 million tons . . . Increase may force improvement of finishing facilities.

• U. S. Steel Corp. is placing emphasis on Chicago and points farther west in its latest expansion move. Chairman Roger M. Blough says market studies indicate that western rise in steel demand caused by increased industrial activity will outdistance increases in other areas.

As a result, U. S. Steel will bump its ingot output by about 2.5 million tons per year within a 2-3 year period, most of it in plants serving mid and far west.

At the beginning of 1955, U. S. Steel was rated at about 38.7 million tons. Including expansion during 1955, the new project will raise corporation capacity to about 43 million tons by 1958.

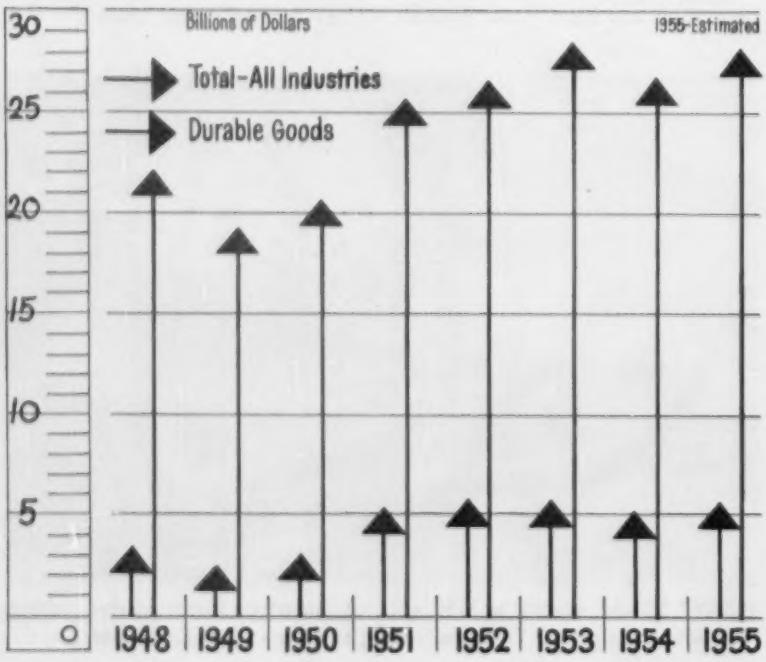
Chicago area plants at South Chicago and Gary are set to benefit by about 1.5 million tons through extensive improvement in existing facilities. This would bring total capacity of these plants to about 14 million tons.

Expansion program is already underway at Geneva, Utah, to add about 380,000 tons of ingot capacity, an increase of about 20 pct.

Projects are in the works for all of the western operations. Extent of the final plans will vary from plant to plant and will be based on the improvements which can be made on existing facilities.

Increases in capacity are expected to occur periodically over the three-year expansion period as individual plant modernization takes place in order.

New Plants and Equipment



Business:

Official government forecast is for good first half '56.

Factory production and consumer sales in 1956 show every indication of achieving new peacetime peaks, the Eisenhower Administration says. As far as the first six months of '56 are concerned, it foresees continued tight supplies of all metals and machinery.

Here's how the U. S. Dept. of Commerce views the business picture for the first six months:

Iron and steel, first half '56 will be highest in history; continued tight supplies of major products; nickel, continued short supply will limit production of nickel-bearing alloys; aluminum, shipments will be at annual rate of 4.6 billion lb in first half, a new high; copper, supply will ease slightly in second quarter but government stockpiling will continue to keep demand from loosening up.

Autos and truck production expected to hit 4.25 million units in first half; aircraft, $13.5 billion backlog will keep industry going at boom levels; shipbuilding, orders for new ships about 18 pct ahead of '55; railroad cars, backlog now better than 150,000 cars, industry will be running at capacity; construction, expenditures will total $44 billion in '56, five pct better than $42 billion all-time mark set this year; machine tools, shipments expected to reach $430 million in first six months.

Farm machinery, unit output will hold at about present levels but price rises will push dollar volume up; construction machinery, steel shortages are limiting output but price rises will keep dollar sales high.

WATCHES: Metalworking In Miniature

Turning out a modern timepiece takes thousands of manhours, hundreds of different size materials . . . Over 3000 taps, dies are needed to produce a new movement . . . Metalworking plays keyrole—*By D. G. Picinich.*

◆ COSTING ANYWHERE from $70 to several thousand dollars, a fine timepiece is one of the most compact, precise, and efficient mechanisms you'll ever own. Behind-the-scenes in its production lies a fascinating story of metalworking in miniature.

At the Hamilton Watch Co., Lancaster, Pa., nearly two years elapse between starting a new watch movement and delivery of the first production unit. During this time, over 100,000 manhours are spent on design and development of the new movement, and the precision tools and equipment to produce it.

This calls for highly coordinated teamwork on the part of staff engineers, chemists, metallurgists, crystallographers, and experts in abrasives, oils, jewels, and electronics.

Involves Many Details

It's estimated there are over 700 different sizes of materials, and over 140 different alloys, used in fine watches and their production tools. Over 3000 different taps, dies, and other small tools and gages are called for from the firm's mechanical department at the start of new production. These will go toward turning out the 120 to 160 parts which all fine watch movements contain.

STEEL mill in miniature turns out high quality metal for cases and intricate watch parts.

Among production highlights is the fabrication of the watch base plate or foundation. Hamilton's plates have a 12 pct nickel content for greater strength and stability. They're plated with rhodium to resist corrosive action.

The average fine watch base plate contains approximately 42 accurately sized and placed holes, 15 cuttings or recesses, and requires 115 operations in the making. For plate operations, the company's piercing and shaving dies produce multiple holes with diameters accurate to .0001 in. and located accurately to .0002 in.

To produce parts with irregular contours, dies are built up of carbide segments, each ground separately in a pantograph machine from a template at an enlarged scale. Finished segments are matched and pressed into rings to form the complete dies.

Own Steel Mill

The heart of any fine watch movement lies in the hairspring and balance wheel. In 1931, Hamilton came up with a multi-metal non-ferrous alloy for hairsprings.

When purchased hairsprings proved unsatisfactory, the firm decided to make its own. Today, the company has a tiny genuine steel mill, complete with electric furnaces, which turns out springs measuring as small as .0035 in. wide, and .00075 in. thick. All told, 73 operations go into making a hairspring.

GEARS, screws and all components of modern watches are precision constructed to fine tolerances and painstakingly assembled by hand.

In all, the "baby" steel mill's total annual output comes to less than half a ton. Of this, all but 25 lb is waste material which ends up on the scrap pile.

Hairspring

Start of a hairspring is a 10 lb ingot. The ingot is forged into a rod with a "hot tip" end still on. This is later cut off and discarded. The rod is compressed into smaller diameter and its length extended.

In its final wire form, the ingot has lost 80 pct of its original weight, and the original rod length of 20 in. has been extended to 20 miles.

After the wire is "spooled," it's wound into hairspring form. Later, it's heat-treated in the electric furnaces, and permanently formed into correct spiral shape to keep the watch ticking.

MINING

CANADA: Mining Market Still Sizzles

Equipment expenditures hit record $378 million this year . . . 1956 given good chance for another record . . . Iron ore output expected to take the strain off tiring Mesabi by 1957—*By K. W. Bennett.*

◆ RED-HOT Canadian market for mining equipment will at least hold and may exceed its record 1955 level in 1956.

The meteoric rise of mining expenditures in the Canadian provinces may hit a temporary plateau, but not for long. It's bound to move upward. And, despite the bonanzas of iron ore unearthed to date, this is the beginning.

In 1951 the Canadian iron mining spending pushoff began. Expenditures for equipment, repairs and construction hit $233 million. In 1952 the figure moved upward to $269 million and in 1953 to $306 million. General slide of business activity in 1954 slowed the Canadian rise but couldn't stop it—expenditures inched up to $307 million. This year's outlays will hit $378 million.

Tireless uranium hunters ranging the northland with Geiger counters, and successful petroleum expeditions laid the foundation for an annual production of at least $32.77 million worth or iron ore and concentrates in Canada. Added to a possible 3 million tons per-year development in Canadian taconite, and a projected 30 million annual tons of taconite in the Lake Superior area of the U. S., the total 66 million tons spell relief for the tiring Mesabi in 1957 and thereafter.

The well-known Quebec-Labrador project and Atikokan are the largest producers, both currently and potentially. Lesser known Dominion Steel and Coal Corporation's Wabana, Newfoundland, holdings will produce 2.5 million tons of ore in 1955, its top projected capacity. The product is being marketed in Europe.

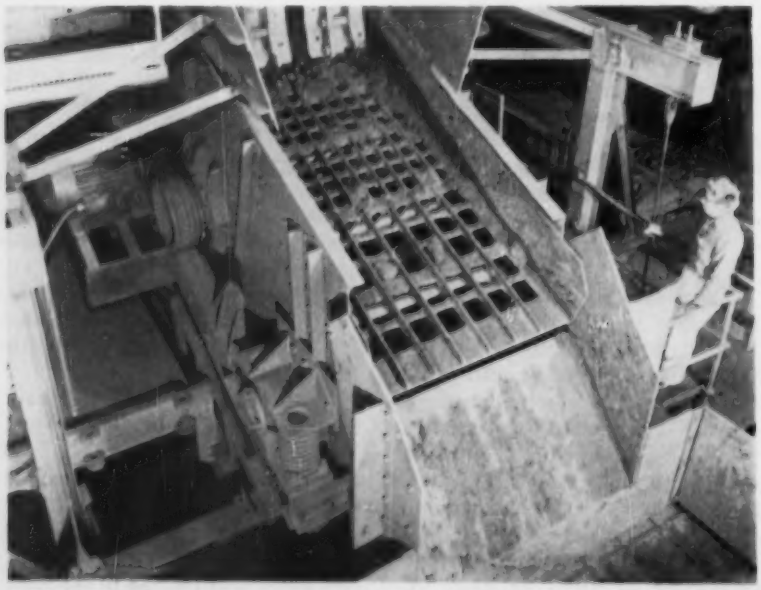
Still in the formative stages are the plans of the Javelin Iron Co. for a new plant with annual capacity of 3 million tons of beneficiated taconite ore. It will be located in Quebec near the St. Lawrence River. Expenditures up to $40 million have been mentioned.

More Projects

The Michipicoten holdings of Algoma Steel Corp. have received a $13 million development outlay. Algoma has put no new capacity rating on the mine, but continues to use the figure 1.5 million tons. The holdings are near the northeast end of Lake Superior, on the path of the Mesabi ore boats. Algoma isn't saying so but the diversification of the company's products may mean that further development of the mines reflects only planned increases in ingot requirements at the home plant.

Sharing in the development, the more common Canadian ores, iron pyrites and iron-taconite combinations, are being smelted in increasing quantities. International Nickel, working with iron pyrites in the Sudbury area, will turn out 1 million tons annually of high purity iron, a product that has already stirred considerable interest in the U. S. It can be shipped economically, like highly concentrated taconite ore, for long distances. In the same area Noranda Mining Co. is pushing for an annual 87,600 tons of a similar product. Falconbridge is studying the process without announcing its intentions.

At Sorrel, Quebec; Quebec Iron and Titanium Corp. is shooting for 500 daily tons of pure iron produced in the smelting of titanium bearing ore. The titanium is marketed as titanium oxide.



DOUBLE-deck screen is a special two bearing design developed by Allis-Chalmers for scalping iron ore in processing plants. More and more modern equipment like this is finding a home in Canadian mining industry.

Missile:

Medium range projectile push shows strategy swing.

Smaller brother to the intercontinental missile with the hydrogen warhead will be an intermediate range weapon on which some of the best Army and Navy engineering talent will concentrate.

President Eisenhower has approved the development by the two older services of a powerful projectile capable of striking targets about 1500 miles from a land or sea launching site. This intermediate range ballistic missile (IRBM) would complement use of the intercontinental (ICBM) blaster that the Air Force will control.

Work on the IRBM will center at Redstone Arsenal, Huntsville, Ala., and will include further improvement of the Redstone missile, which has been test fired.

Stress Long Range

A new ballistic missile committee, with Navy Secretary Thomas and Army Secretary Brucker in the first and second spots, will supervise and encourage the activity.

Emphasis on the long and intermediate range weapons is indicative of Pentagon plans to speed the transition from heaviest reliance on piloted aircraft to a greater dependence on missiles for lengthy attack missions.

The Defense Dept. will maintain its jet plane procurement in the foreseeable future, but more funds are to be earmarked for missile development than at any previous time.

In its budget request for fiscal 1957, the military leaders are expected to ask for more than $1 billion to be used exclusively for missile projects. Current-year expenditures for this purpose are figured unofficially at just under $600 million.

Change Profit Policy

Fair profits for companies delivering products to the military under long-term fixed-price and redeterminable contracts are assured by a new Defense Dept. progress payment policy.

All told, the contracts affected by the change have a value approaching $5 billion. Large procurement items, such as planes, are particularly involved in the policy shift.

A Pentagon directive just out eases a three-month-old plan whereby partial payments were limited to 105 pct of the output cost, or a 5-pct gross profit. Now the profit may be raised to as much as 10 pct.

Contractors will send simplified quarterly reports to the military, indicating just how much has been received in payments during the months covered. Sums exceeding costs plus fair profit, as adjudged by the Pentagon, are to be refunded.

New Fallout Meter

Users of a newly-developed device for measuring radio-active fallout will find it easier to locate safest shelter areas in plants or office buildings following nearby atomic attack.

Navy scientists built the instrument to fill a need for an inexpensive meter with a civil defense application. It is small, operates simply, indicates both the presence and amount of fallout, uses components available commercially, and can be produced in quantity.

The radiation-detection element is a cadmium sulphide crystal. Gamma radiation touching the crystal starts on electrical current, charging a capacitor. When the capacitor is fully charged, it discharges and lights a neon lamp, which flashes on and off as the capacitor charges and discharges.

Weapons Study Set

Skilled assistance in planning future weapons will be provided the Defense Dept. under its new contract with Massachusetts Institute of Technology.

Through this arrangement, MIT will help the Weapons Systems Evaluation Group (WSEG) of the armed forces in conducting analyses of present and forthcoming weapons systems. Other scientific institutions and universities will join in the project later.

No profit is to accrue to MIT from its work with the weapons group. The WSEG has the job of making objective studies of the influence of weapons systems on strategy. Its director is Lt. Gen. S. E. Anderson, USAF.

WORLD'S BIGGEST helicopter, Air Force's XH-17, completes test run by lifting big van, largest object ever carried by rotor craft. Helicopter was built by Aircaft Division of Hughes Tool Co.

EXPANSION IN INDUSTRY

Titanium:

Mallory Sharon integrate melting, rolling facilities

Titanium took another step toward maturity last week as Mallory Sharon Titanium Corp. became the first titanium company to have its own integrated melting and rolling facilities. The firm purchased the Niles Rolling Mill Div. of Sharon Steel as the first step in an expansion program designed to double capacity next year.

Announcement of the purchase from Sharon Steel Co. was made by James Roemer, president, following a board of directors meeting.

Rem-Cru Titanium rolls its products at Crucible Steel Co. Titanium Metals Corp. of America operates similarly with Allegheny-Ludlum Steel Co. Latter is also a basic sponge producer through its reduction plant at Henderson, Nev. Republic Steel also has integrated titanium melting and rolling facilities at its Massillon and Niles, O., steel works and a titanium mine in Mexico.

"Integration of melting and rolling facilities under a single management was the next logical step in gearing up to meet the rapidly increasing demand for titanium mill products," Mr. Roemer said.

Facilities now include the titanium melting plant, research laboratory, rolling mill, engineering and administration buildings occupying 22 acres.

In the expansion program remote controlled vacuum double melting furnaces will be added for Mallory Sharon's double melting process.

Bulk of the titanium output from Niles is going to jet engines and airframes. Price declines are also bringing about acceptance for valves, chemical piping and equipment, surgical implants and marine hardware due to corrosion resistance properties.

CONVEYOR belts destined for Sparrows Point, Md., will be used to unload ore from ocean going vessels. Each roll is 1400 feet long and weighs about 20 tons. They are made of rubber compounds and tough 7-ply rayon.

Steelmaking:

Weirton Steel to install 600-ton openhearth furnace.

Weirton Steel Co. division of National Steel Corp. has announced plans for the construction and installation of a 600-ton open-hearth furnace, reported to be the biggest unit of its kind yet attempted.

The project is part of the National Steel $200 million expansion program. The goal is to add a million tons to present annual capacity within three years.

Construction engineering work on the proposed new open-hearth will be handled by Loftus Engineering Corp., Pittsburgh, Pa.

Expansion Briefs

Apex Smelting Co., Chicago; custom smelter and alloyer of aluminum; construction of an addition to Calif. smelting plant designed to double plant capacity.

Texas Eastern Transmission Corp., Shreveport, La.; applied to Federal Power Commission for authorization to construct new 30 inch pipeline from Beaumont, Tex. to Mexican border.

National Lock Co., Rockford, Ill.; new $5 million factory to house one of country's largest screw and bolt plants.

Dominion Foundries & Steel, Ltd., Hamilton, Ont.; $15 million program including new blast furnace; increase capacity from 600,000 to 720,000 tons annually when completed.

Alberta Phoenix Pipe & Tube Mills; new $6 million plant for manufacture of gas transmission pipe; Edmonton, Alberta, Canada.

How forged weldless rings and flanges...
improve your product and cut your costs
Standard Steel Works Division
BALDWIN-LIMA-HAMILTON

free! this informative booklet on...

"How forged weldless rings and flanges improve your product and cut your costs"

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When you consider a change in your product, you expect that change to make money for you or to save money for you.

It's quite possible that Standard Steel Forged Weldless Rings and Flanges will do *both*.

They improve your product, thus making your sales task a little easier, and they cut your manufacturing costs. In many cases, first cost may be less than the component you now use, and always machining time is less.

In checking through this detailed booklet, you'll be able to determine in five minutes or less whether they're worth investigating further. Send the coupon now.

Dept. 8716, Standard Steel Works Division
Baldwin-Lima-Hamilton Corporation, Burnham, Pa.

Please send me Bulletin No. 10,000, "How Forged Weldless Rings and Flanges Improve Your Product and Cut Your Costs."

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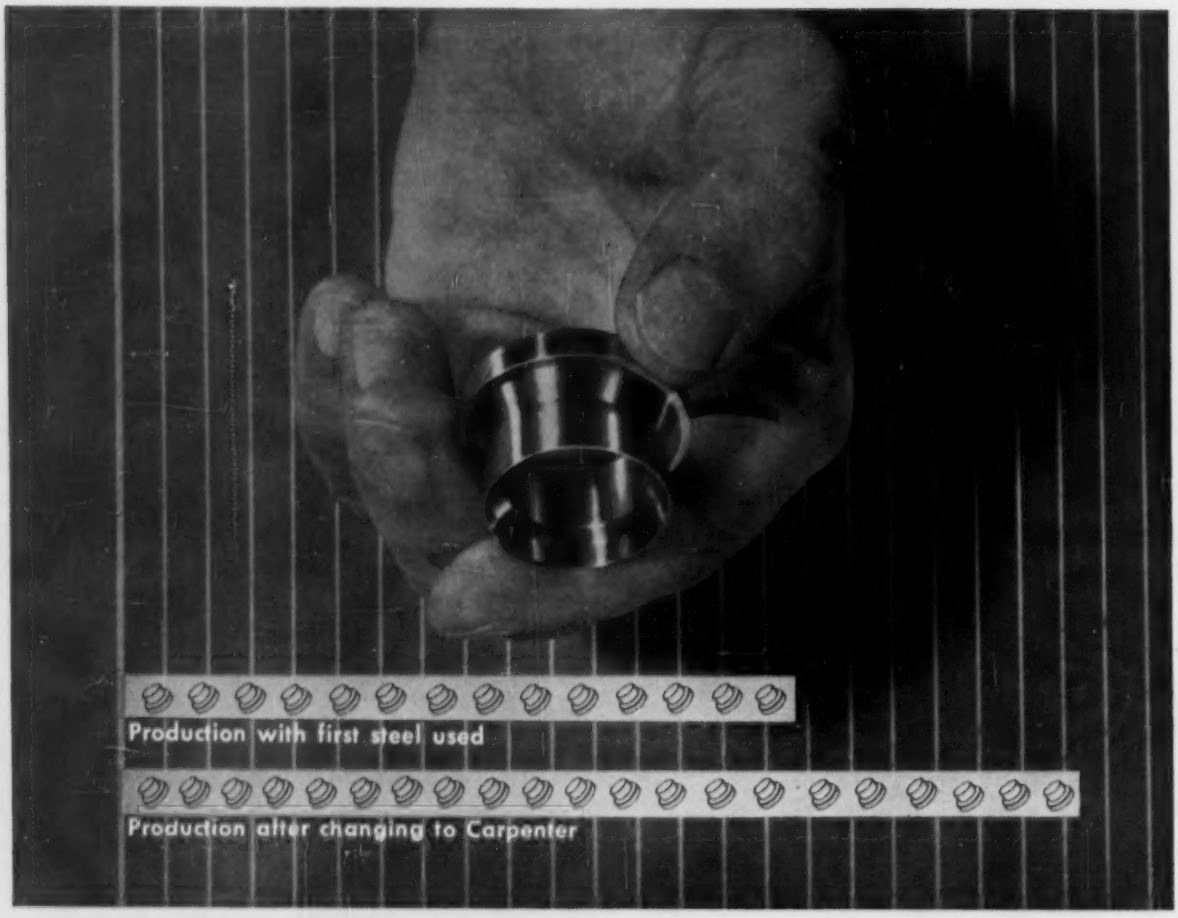
Carpenter ... pioneers in specially-engineered steels through continuing research



HOW FAR CAN YOU GO

in stepping up production of critical parts?

Production of these stainless steel spuds used in electric and gas water heaters was fairly satisfactory when they were made from an ordinary stainless steel. But someone in the plant wasn't satisfied . . . and took time to explore the possibilities for improvement.

Hearing about the easier machinability of a special modified stainless made by Carpenter, the order to change steels went through. Now production is up 30% . . . and rigid requirements involving close tolerances, cleanliness, and corrosion resistance are met with an extra margin of safety.

Every week, more companies like yours are demanding and getting better results in productivity, product performance and product salability. And Carpenter is helping them . . . bringing to bear on product-improvement problems almost 70 years' experience in the development of new and improved specialty steels.

One move can get you started in the right direction. Write for a copy of our 36-page booklet, "A Guide to Specialty Steels as Made by Carpenter." *The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.*

Are you taking advantage of these specially-engineered steels as made by Carpenter?

Matched Tool and Die Steels / Stainless Steels / Special Purpose Alloy Steels / Silicon and High Nickel Alloys / Valve, Heat-Resisting and Super Alloy Steels / Tubing and Pipe / Fine Wire Specialties

Carpenter STEEL

for product improvement

Report to Management

Why All the Worry?
You will be hearing all kinds of cries of alarm with every hint of cutbacks in auto production. GM divisions have admitted some moderate revisions in production schedules and Ford disclosed cutbacks in connection with the company's recent stock prospectus.

You have the choice of joining the alarmists or making your independent evaluation of the broad metalworking market situation. There's no doubt that there is a seasonal sag in auto sales. There's also evidence that 1956's don't have the appeal that was offered in the 1955 models, which probably embraced the most sweeping changes in auto history.

That just can't happen every year. Economics and sheer limits on the industry's capacity to change dictate that 1955 won't repeat itself very often in impact of a model year on the buying public.

There's really no reason to run for cover or start retrenching because auto sales are "comparatively" slow. "Comparatively" in this case means only the second best year in history coming up in 1956.

Automobiles Aren't Everything
Important as they are (and this is no attempt to minimize their impact on the economy), there's a serious danger of believing that the economy is a house of cards that is in danger of collapsing because of a logical, moderate decline in auto production.

Look at the Whole Picture
Against a moderate decline in auto production, weigh some of these factors that are not rumors, but are already on the books.

Orders for new freight cars climbed to a record high of 51,066 in November, compared with 12,843 in October. This large increase followed the decision of the railroads to place orders for 87,000 new cars between November 1 and the end of the year.

This leaves a backlog of 109,370 cars on order and undelivered. At an industry rate of about 5500 a month, limited only by available steel, this puts orders almost 18 months out in front.

The oil and gas and electric industries are expanding at record rates, not to meet a mythical demand, but the real requirements of a growing population. Aluminum and steel are entering new growth periods to meet the requirements on their facilities.

A moderate cutback in auto production could be healthy for industry. It would provide a breather for some others who have begged in vain for more steel to meet their own markets which are in no way dependent on Detroit.

Figures Are Misleading
And don't be misled by charts and graphs which don't register the same rates of economic climb in future months. Remember, figures are already at the top of capacity. They can't go much higher or continue to show the same rate of increase that they did a year ago.

A Change of Pace
You can expect to hear a lot more about water pollution in 1956. Pollution is spreading far beyond the point where it is only an annoyance to fishermen and nature lovers.

It's a grave matter to many communities that draw their drinking water from rivers and streams that carry the waste from factories and mines. Congress will be asked to give financial aid to states fighting the problem. Industry, in turn, will be asked to do more about waste disposal.

INDUSTRIAL BRIEFS

Flying High . . . Allison Div. of General Motors received the order from Eastern Air Lines to power its new fleet of 40 Lockheed Electra airliners. The initial order for 200 engines of an improved Allison 501 model, and a similar number of Aeroproducts complete propeller assemblies, amounts to about $26 million. Provision is also made for production of an additional 150 GM prop-jet power units for the 30 Electras on which Eastern has an option.

More and More Steel . . . More finished steel products were shipped from mills during October and the first ten months of 1955 than in any similar previous period. American Iron and Steel Institute announces that October shipments totaled 7,216,821 net tons, nearly 1.3 million tons more than the previous record.

Fresh Water . . . Dravo Corp., Pittsburgh, has been awarded a contract to expand the water pumping and supply system at the central pumphouse of Jones & Laughlin Steel Corp.'s Aliquippa works. The new facility is necessary for the operation of a new hot strip mill now under construction.

Busy Channels . . . Combined shipments of iron ore, coal and grain by Great Lakes vessels in 1955 totaled 151,337,810 net tons on Dec. 1. This was almost 33.5 million tons ahead of the corresponding figure last year. November ore shipments amounted to 7,409,793 gross tons, second highest total for the month.

Who's Who . . . A comprehensive directory of steel foundries in the U. S., Canada and Mexico is published by Steel Founders Society of America, Cleveland.

Reaching Out . . . United Pipe Column & Railing Co., Morristown, Pa., has been acquired by the Solar Steel Corp., steel warehousing and processing company. Operations of the company in the fabrication of structural columns, railings and miscellaneous iron fabricated products will be continued as a division of Solar.

Bounty . . . Radio Receptor Corp., Brooklyn, is offering distributors 10¢ for each used rectifier made with selenium, a mining by-product of copper. The company has just announced perfection of a new selenium rectifier which will operate at temperatures to 150 degrees.

Canada Air Exhaust . . . Noorduyn Norseman Aircraft Ltd., St. Laurent, Quebec, Canada, has been named sole Canadian sales agent for the line of aircraft exhaust systems and airframe assemblies made by the Aircraft Div., Ledkote Products of N. Y., Inc.

Shift . . . Motorola Communications and Electronics Div. has moved its Microwave and Industrial Products Dept. into new quarters in Chicago. The new facilities will house office, manufacturing and engineering sections.

Powerful Pumps . . . Cleveland Electric Illuminating Co. has ordered two new type boiler feed pump turbines, each rated at 7000 hp, from Small Turbine and Supercharger Dept. of General Electric.

Sensitive Agent . . . Metalphoto Corp., Cleveland, manufacturer of photo-sensitive anodized aluminum plates, has named Grover Photo Products, Glendale, Calif., distributor in 11 western states.

Elbow Room . . . Purchase of a 125,000-sq ft building, formerly occupied by ADSCO Industries, is announced by Tube Manifold Corp., Buffalo. Acquisition of the new plant provides three times the manufacturing space of the company's present factory in Buffalo. Expansion was necessitated by increased volume of business and introduction of new Tube Manifold products.

Help Coming . . . An aid-to-education program totaling $462,000 has been approved by the Pittsburgh Plate Glass Foundation. The program features financial aid to outstanding high school graduates and direct financial aid to privately endowed colleges and universities. Funds will be disbursed during the next four years according to plans.

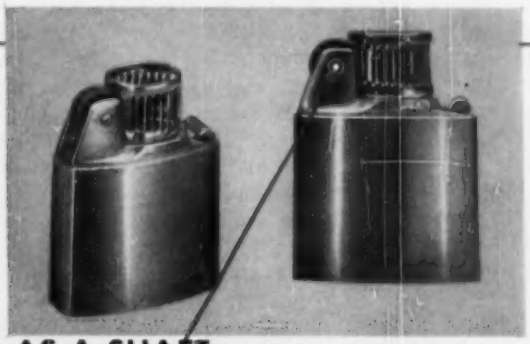
Helping Out . . . Schneider & Marquard, Inc., Brooklyn, N. Y., observed the company's 25th anniversary by contributing $5000 to be shared jointly by the American Cancer Society and the American Heart Assn. The amount of the contribution was arrived at by estimate of the cost of a conventional anniversary celebration. The company is specialist in mica dies for the growing electronics industry.

Rolling Stock . . . Southern Railway System has placed an order for 2500 freight cars with the Bessemer, Ala., plant of Pullman-Standard Car Manufacturing Co. The order will cost $24 million when completed.

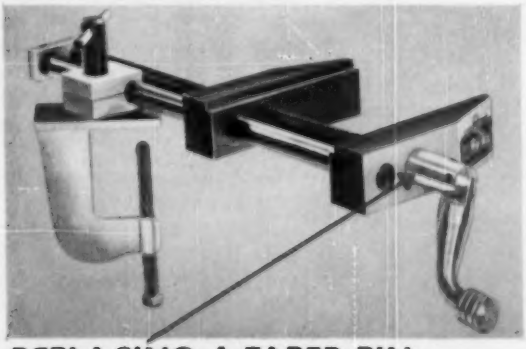
Rough Dealer . . . Harron, Rickard and McCone Co., Southern Calif., has been named dealer for the line of abrasive belt machines made by Engelberg Huller Co., Syracuse, N. Y.

Three typical Rollpin cost reductions

AS A RIVET Rollpin cuts material and assembly costs 25% on Reynolds Gas Regulator Co.'s toggle lever assembly.



AS A SHAFT before and after shot of this Ronson lighter shows how Rollpin made savings of 1½¢ per unit in assembly of spark wheel.



REPLACING A TAPER PIN Rollpin saves 24¢ labor cost on each of American Machine and Foundry's MITY-7-VISES. Eliminates tool cost caused by breakage of small taper reamers.

ESNA

ROLLPIN TRADEMARK

Where can you use this simple fastener?

If you use locating dowels, hinge pins, rivets, set screws—or straight, knurled, tapered or cotter type pins—Rollpin can cut your production and maintenance costs as it does in every class of industry. Rollpin is a slotted tubular steel pin with chamfered ends that drives easily into standard holes, compressing as driven. Its spring action locks it in place—withstanding impact loading, stress reversals and severe vibration. No threading, peening or precision drilling needed. Rollpin is readily removable and can be re-used in the same hole.

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MAIL COUPON FOR DESIGN INFORMATION

Elastic Stop Nut Corporation of America
Dept. R38-1277, 2330 Vauxhall Road, Union, N. J.

Please send the following fastener information:

☐ **Rollpin samples**

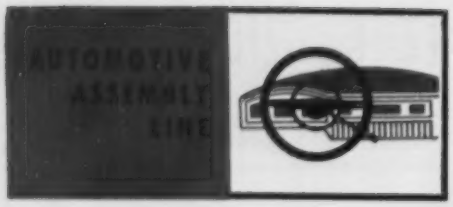
☐ **Rollpin bulletin**

☐ **Here is a drawing of our product. What self-locking fastener would you suggest?**

Name _____ **Title** _____

Firm _____

Street _____ **Zone** ____ **State** _____



Background on Ford's Financial Statement

Sales for first nine months surpass $4 billion . . . Company climbed from $8 million loss in 1946 to present earning position . . . All expansion financed by earnings . . . Option plan—By T. L. Carry.

◆ LONG-AWAITED announcement of Ford Motor Co. earnings shows that during the nine years from 1946 to 1954, the company made one of the most spectacular financial recoveries in the country.

In 1946 Ford suffered a net loss of $8.1 million. But by the end of 1954, the company's net earnings were $227.8 million.

The information is disclosed in a prospectus filed with the Securities and Exchange Commission in Washington prior to public sale of 10,200,000 shares of Ford stock next month.

Other information contained in the prospectus shows that during the first nine months of this year the company's sales totaled $4,042,600,000. And net income for the same period was $312,200,000. The total capital and earnings retained as surplus at the end of September was $1,840,000,000.

New Line Coming . . . It was also officially confirmed for the first time that Ford will bring out a new car which will compete with the Buick and Oldsmobile lines. The new line has been an open secret in Detroit since last spring and it is believed that it will be introduced sometime in 1957.

In addition, Ford is undertaking a stock option plan for all salaried employees. Under the plan an employee may contribute up to 10 pct of his salary but not more than $2000 in any calendar year. The company will contribute half the amount of each employee contribution and the money will be spent for stock and government bonds.

Quarterly Dividend . . . It is estimated that when the stock goes on sale next month it will sell for between $60 and $70 per share.

The board of directors has adopted a resolution to declare a 60 cent dividend for the first quarter of 1956. After that, the amount of dividends will be considered quarterly and will be subject to business conditions and the financial position of the company.

In this connection Ford admits that dealer stocks of Fords and Mercurys have increased in recent months and future production schedules have been cut.

It can be readily seen that Ford's financial position in the past nine years has been most enviable. All of the capital improvements that have been made since World War II were from company earnings.

General Motors sales and profits so far this year are much bigger than Ford's but up to the end of this year, Ford has never had to quibble with stockholders about how its money should be spent or invested.

Ford presently has no plans to offer stock to its factory workers. The UAW turned down a plan by which the membership at Ford could have purchased the stock and since then the union has made one attempt to have the company reconsider its offer.

Won't Be Pushed . . . Carl Stellato, president of the militant Ford Local 600, claims that the workers have helped to build the Ford empire and should be entitled to share in the company's earnings if they want to.

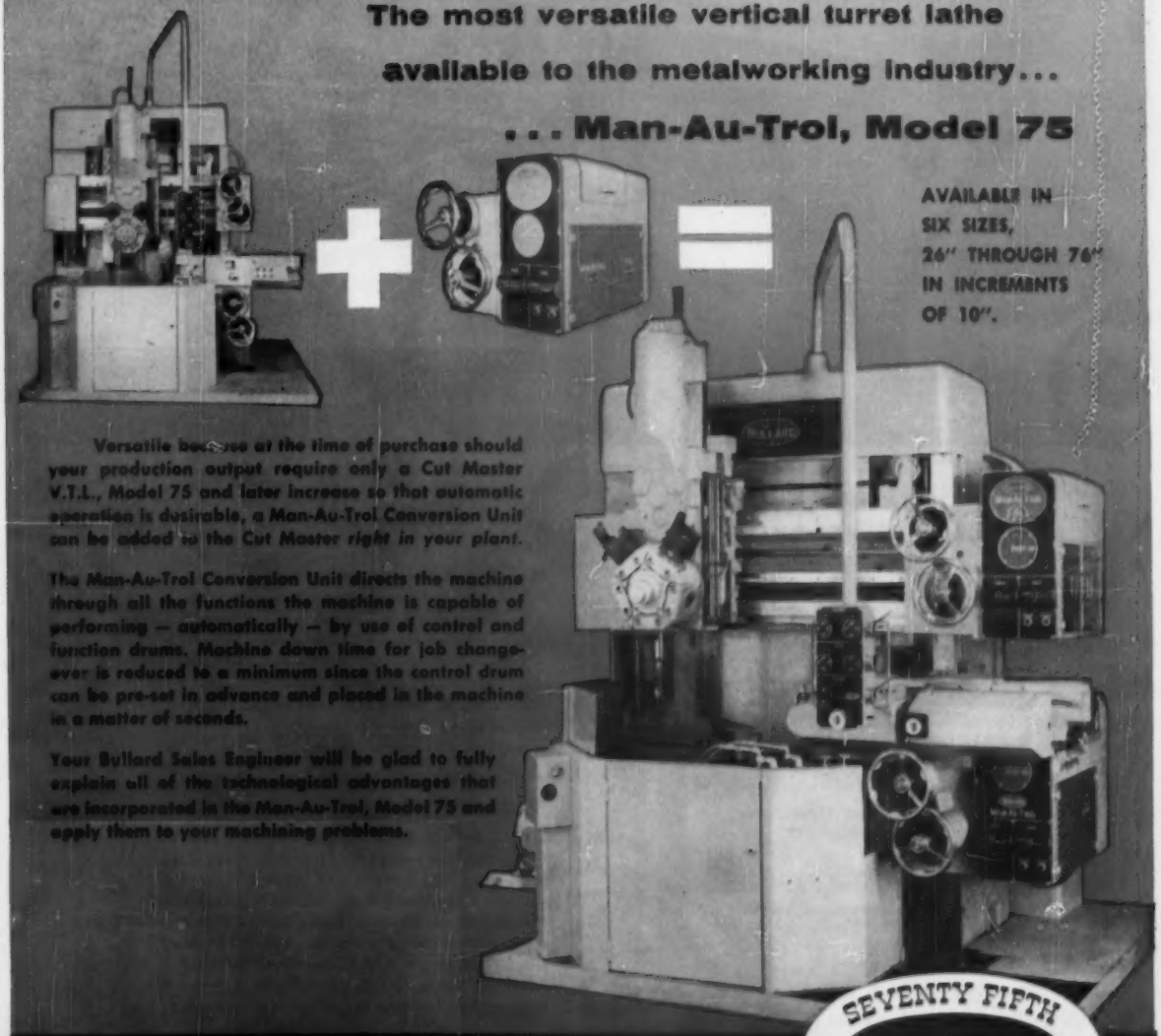
The company, through John S. Bugas, vice president in charge of industrial relations, has not entirely slammed the door on the

FIREBIRD II, GM's second experimental gas turbine passenger car, has been successfully tested and will be shown to the public with touring Motorama, starting Jan. 19 in New York. For details, see p. 39.

Machine Tools for *Today* and *Tomorrow!*

The most versatile vertical turret lathe available to the metalworking industry...

... Man-Au-Trol, Model 75



AVAILABLE IN SIX SIZES, 26" THROUGH 76" IN INCREMENTS OF 10".

Versatile because at the time of purchase should your production output require only a Cut Master V.T.L., Model 75 and later increase so that automatic operation is desirable, a Man-Au-Trol Conversion Unit can be added to the Cut Master *right in your plant.*

The Man-Au-Trol Conversion Unit directs the machine through all the functions the machine is capable of performing — automatically — by use of control and function drums. Machine down time for job change-over is reduced to a minimum since the control drum can be pre-set in advance and placed in the machine in a matter of seconds.

Your Bullard Sales Engineer will be glad to fully explain all of the technological advantages that are incorporated in the Man-Au-Trol, Model 75 and apply them to your machining problems.

SEVENTY FIFTH 1880 BULLARD 1955 ANNIVERSARY

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IN ANSWER TO THE GROWING DEMAND FOR
SANDVIK QUALITY STEELS—
NEW
SANDVIK PLANT
Main Office
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Modern Rolling and Slitting Facilities
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TO BENEFIT USERS OF ALL SANDVIK PRODUCTS

The new Sandvik building provides modern, expanded facilities for the *administrative, production* and *Eastern Warehouse* operations of the main company and all divisions, including:

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Carbide Tipped Tools, Blanks and Inserts. Milling and Combination Cutters.

SANDSTEEL SPRING

Power springs for watches, instruments, office machines and other industrial uses.

SANDVIK STEEL BELT CONVEYORS

Cold rolled Carbon and Stainless Steel Belt Conveyors for Material Handling and Processing.

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High Quality Swedish Hardware, Tools and Specialties.

Works: Sandviken, Sweden • Hellefors, Sweden

Sandvik Quality Steels

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For applications which require HIGH FATIGUE LIFE, FINE SURFACE FINISH, ACCURATE & UNIFORM GAUGE specify SANDVIK cold rolled specialty strip steels.

You can get Sandvik strip steels:

- In special analyses for specific applications.
- Precision-rolled in thicknesses to fit your requirements.
- In straight carbon and alloy grades.
- Annealed, unannealed or hardened and tempered.
- Polished bright, yellow or blue.
- With square, round or dressed edges.
- Wide range of sizes in stock—
  —or slit to your specifications

Ask your nearest Sandvik office for further information or technical assistance.

Sandvik Swedish Specialty Strip Steels are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical, etc. • Razor Blades • Shock Absorbers • A Wide Variety of Springs • Trowels • Reeds: Vibrator, Textile, etc. • Piston Ring Segment and Expanders • and many other applications.

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Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Dec. 24, 1955	161,198	21,266
Dec. 17, 1955	175,638	28,180
Dec. 25, 1954	129,756	19,662
Dec. 18, 1954	157,245	22,605

*Estimated Source: *Ward's Reports*

union. However, Mr. Bugas has made it clear that, if and when the stock is offered to the workers, it will be because Ford wants to offer it and not because of any pressure from the union.

Chances are that more than one member of the union is secretly pulling his hair in frustration over the whole situation.

It is widely believed in Detroit that Walter Reuther, president of the UAW, passed up a good thing for the membership when he insisted on an SUB plan rather than stock options.

Gas Turbines:

GM's Firebird II shows new developments.

Although GM has made some startling advances in the last two years on its gas turbine engine, the car is still a long way from the production stage.

A new turbine-powered car, Firebird II, will be on public display at Motorama in New York next month. It is still an experimental car but the vehicle has been designed for actual highway use as a 4-passenger family car.

One of the main features of the car's engine is a newly developed heat exchanger which recaptures more than 80 pct of the turbine exhaust heat and uses it to raise the temperature of intake air.

Better Economy

GM claims that the heat exchanger is a key factor in the car's improved operating economy because less fuel is used to bring the incoming air up to its proper operating temperature.

Other features of the car are a special automatic transmission and new all-metal disk brakes.

The transmission is a 4-speed planetary gear unit with an idle cutout that allows the turbine to drive accessories in the rear without actually driving the rear wheels.

Weight Distribution

It is mounted between the car's rear wheels, thus obtaining better weight distribution and eliminating the hump in the floor of the passenger compartment.

The new brakes consist of disks that rotate with the car's wheels. When hydraulic pressure is applied, the disks are squeezed between pads of metal lining material.

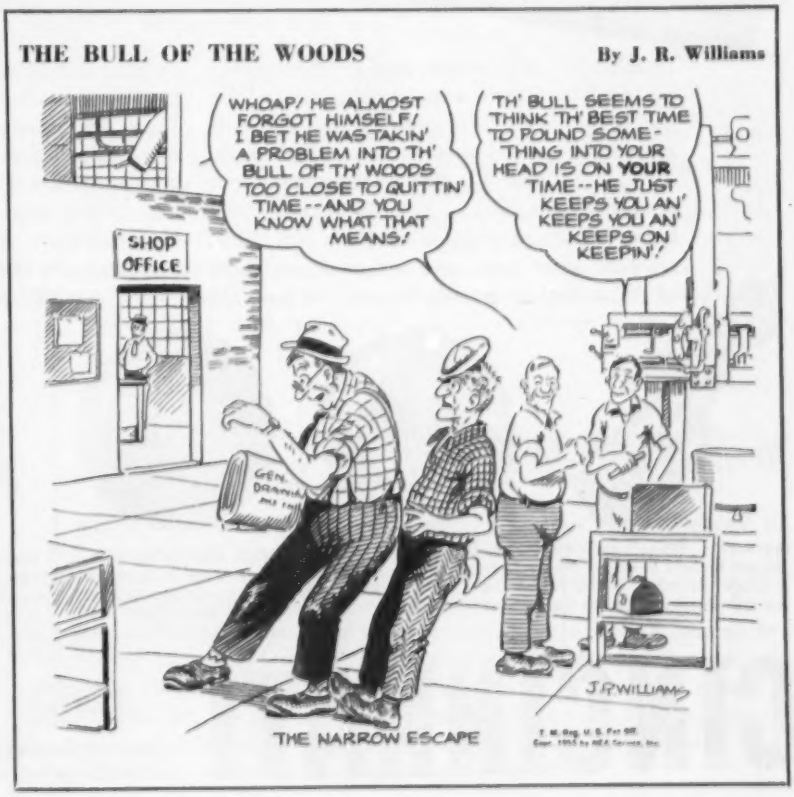
The brakes have a built-in cooling system which completely eliminates fade. That is the general loss of braking power as ordinary brakes become hot.

The disks have an air space between their braking surfaces with blades that force air through the disks while they are spinning. In this way, the heat generated by the braking action is quickly dissipated. The metal linings serve as cooling agents because the special alloy used can withstand higher temperatures better.

Harlow H. Curtice, GM president, says the car has been designed and built, like its predecessors, to study the commercial possibilities of the gas turbine engine.

As of right now, the commercial end of the business is very remote because of the extremely high costs involved. But Mr. Curtice adds that GM has come a long way in development of the engine since the project was first undertaken in 1949. The results so far are highly encouraging.

This doesn't mean the turbine will be the new source of automotive power over night or even within 5 or 10 years. It means that engineers are slowly finding answers to many of the problems involved in building a turbine and hope that eventually an economical unit will be able to be built on a mass production basis.


THE BULL OF THE WOODS
By J. R. Williams
WHOAP! HE ALMOST FORGOT HIMSELF! I BET HE WAS TAKIN' A PROBLEM INTO TH' BULL OF TH' WOODS TOO CLOSE TO QUITTIN' TIME--AND YOU KNOW WHAT THAT MEANS!
TH' BULL SEEMS TO THINK TH' BEST TIME TO POUND SOME-THING INTO YOUR HEAD IS ON YOUR TIME--HE JUST KEEPS YOU AN' KEEPS YOU AN' KEEPS ON KEEPIN'!
SHOP OFFICE
J.R.WILLIAMS
THE NARROW ESCAPE

You're Sure of Precision and Production with NEW Cincinnati Filmatic Plain Hydraulic Grinders in Your Shop

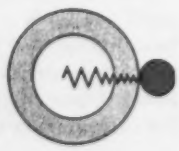
Speculation in precision and production has no place in today's metalworking shops. You can quickly end the guesswork where it hurts most . . . in your precision cylindrical work. Just install new CINCINNATI FILMATIC Plain Hydraulic Grinders in your shop and you'll have definite production that you can count on year after year, and within closer limits of accuracy than ever before. ¶ Several Cincinnati features that help you attain these highly desirable results are illustrated below. These and many other features, translated into benefits for your shop, are outlined in two attractive catalogs: G-660 for the 6"R dnd 10"L machines; G-661 for the 10"R and 14"L machines. Write for copies.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

Automatic Wheel Balancing and FILMATIC Grinding Wheel Spindle Bearings are standard equipment. (FILMATIC principle illustrated at the right.) These two cost-reducing features alone are reason enough to choose Cincinnati.

High degree of accuracy is easier to obtain than ever before because of the new infeed unit.

Automatic electric gage sizing (extra) includes an exclusive Cincinnati advantage . . . automatic compensation for wheel wear and truing.



Gap eliminator . . . greatly reduces time spent in "cutting air" during automatic infeed grinding operations. (extra)

CINCINNATI

FILMATIC CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Air Force Gets Most of Defense Boost

Procurement of guided missiles figures in requests . . . Air Force wants $700 million more than in current budget . . . Army decides not to store all industrial equipment in new policy—By G. H. Baker.

◆ IF YOU'RE in the market for a government contract in 1956, try the Air Force. A roaring expansion program is being set up for the new fiscal year.

The Defense Department is planning to ask Congress for a fat $17.2 billion for U. S. air power in fiscal 1957. This is $700 million more than the Air Force is spending in the current fiscal year.

Procurement of guided missiles will figure heavily in the new Air Force buying program. Marked emphasis will be placed on so-called "mid-range" missiles — those which are most effective in the 1000 to 5000-mile category.

Air Force Wins . . . In addition, Army and Navy defenses also are slated for substantial increases in the 12-month period starting July 1. The Pentagon is planning to ask Congress for a $100 million increase in the current Army spending rate of $8.6 billion, and the Navy's outlays are to rise by $200 million from the current level of $9.7 billion.

As you can see, the Air Force wins the lion's share of the increases. While these figures are only proposals at this point, there are some strong political indications that the men in Congress who control the purse-strings will stamp "approved" on the new money requests. The sum of the Army, Navy, and Air Force requirements will total up to $35.5 billion—an even $1 billion higher than the present rate of spending.

Change Tool Policy . . . The Army has quietly but firmly decided that it will not try to buy and store all the industrial equipment needed for operation in a future war. This means that only minimum orders for machinery, machine tools, and for the component parts of production lines will be purchased by the Army.

Says Army Secretary Brucker, in a significant new policy speech:

"It is not our policy to pile up and store away all of the large quantities of materiel that would be necessary to support a major war."

Minimum Stockpile . . . Placing too much reliance on old equipment would mean that our troops would be forced to fight with "second-best tools." This kind of a situation would doubtless be fatal.

Only reasonable solution is for the government to stockpile only the minimum amounts of equipment necessary to meet what Mr. Brucker calls "immediate mobilization requirements."

Goal, of course, is to keep production lines up to date so that the materials of war can start moving off the ends of the assembly lines quickly when they are needed. "We are laying away complete production facilities," Mr. Brucker says.

The military will continue to strive for a constant, up-to-date inventory of its industrial capacity.

Open Foreign Markets . . . U. S. manufacturers who have tried in vain to enter their products in foreign markets are due for a break, the State Department reports. It says there are "encouraging signs" that some of the overseas discriminations against U. S. goods are being reduced.

Western European nations, in particular, make it difficult if not impossible for U. S. manufacturers of machinery and leather goods, for example, to get a toehold in their markets. They simply don't let U. S. goods enter their ports.

Latest word, however, is that the trade and tariff talks held at Geneva recently have resulted in

Cut That Duplication

▪ Business drive to reduce unnecessary paperwork demanded by the government is getting action. Treasury Department and the Department of Health, Education, and Welfare will propose next year that Congress consolidate wage reporting on an annual basis.

▪ Unification of wage reporting for social security and income tax purposes has been urged by businessmen for some years. One estimate is that it will save business at least $25 million a year.

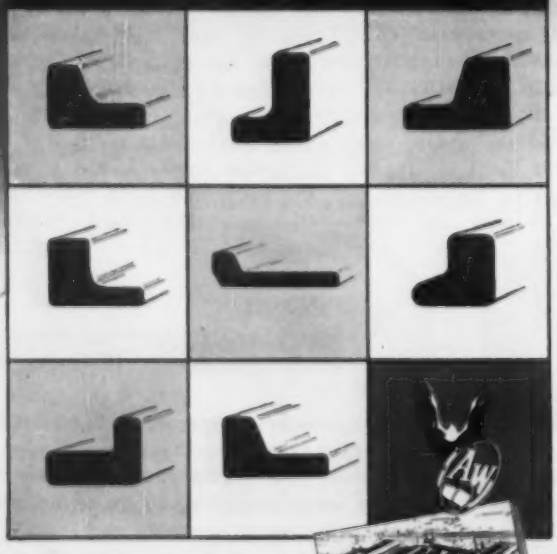
▪ At present, employers file 12 million quarterly wage reports each year, plus more than 3 million social security reports once a year. That means a lot of duplicated effort.

Rings welded from
THIS SHAPE

instead of **THIS BAR**

SAVED $112,084.00
on a single order of flash-welded rings!

TYPICAL MILL-ROLLED AND EXTRUDED SHAPES
AVAILABLE FROM AMERICAN WELDING



Send for Free Catalog of Production Facilities
Find Out What American Welding Can Do For You

Substitution of a mill-rolled section for a forging previously used, cut the weight of a rough ring 114 lbs. Combined material and machining savings realized in the finished ring amounted to $200.15 per ring —a total of $112,084.00 on a single order.

Economies like this are being effected every day by roll-forming and flash butt-welding of special mill-rolled shapes. Perhaps our Industrial Products Division can help you reduce production costs on similar circular components. Write today for complete information — include blueprints — we will be glad to study your problem.

AMERICAN WELDING

THE AMERICAN WELDING & MFG. CO.
120 DIETZ ROAD • WARREN, OHIO

a friendlier attitude on the parts of our allies. Scope of the discriminations is "being significantly reduced," it is reported.

Details are yet to come, if the Western European nations suit their actions to their words, the U. S. export possibilities will be a lot rosier in a few more months than they are in these currently bleak days of Europe's high trade barriers.

Set Gripe Session

Smaller firms that find it difficult to obtain defense contracts or subcontracts are being invited to come to Washington early next month and tell a Senate subcommittee their troubles.

Public hearings, to be held on Jan. 5 and 6, will be aimed specifically at finding out how current military procurement policies affect small business. Sen. George A. Smathers, D., Fla., will be in charge.

Additional hearings will be held later in the winter, and the probe will extend well into the spring.

Senator Smathers wants to know why participation of small business "should drop from 25.1 pct in 1954 to 21.8 pct in 1955 during a period when the net value of Defense Dept. spending increased some $3 billion."

Protest:

Political use of union funds draws member complaint.

More and more union members are openly objecting to the use of union funds for the political support of either major party. Some are complaining bitterly that union dues are being used to support only the Democratic party.

Three members of CIO unions in Michigan say the United Auto Workers leadership is "delivering union dues to the Democratic party." And these members further charge that any worker who protests this diversion will very likely lose his job—or "something worse."

Oppose Union Stand

They suggest that "something worse" means that any loud squawking over how big unions spend their income will bring a squad of "professional persuaders" to the offending brother's back-door. The "persuaders" want to take the brother into the alley.

Another member says a recent survey by Wayne University shows that 66 pct of UAW members in the Detroit area oppose union political action, and that 41 pct of the nation's workingmen prefer the Republican party. UAW, he adds, admits that $384,000 of the union's education fund has been used for political purposes.

See Split Vote

The three union members told their stories at a press conference called by Sens. Carl T. Curtis, R., Neb., and Barry M. Goldwater, R., Ariz., because chairman Thomas C. Hennings, Jr., D., Mo., declined to take the trio's testimony before his Senate Constitutional Rights Subcommittee.

Meanwhile, Secretary of Labor Mitchell predicts that a lot of union members and other workers will vote Republican in the 1956 election. He says he agrees with AFL-CIO President George Meany that union votes "cannot be controlled."

"The working man has never had it so good," Mitchell says, "and he is certainly going to think about the reasons for that high prosperity."

WASHINGTON NEWS

Freight:

ICC hears arguments on East Coast ore rates.

Rail rates on imported iron ore shipments from four major East Coast ports to the Ohio-West Virginia steelmaking area are giving the Interstate Commerce Commission much concern.

Causing the trouble is the present rate structure which permits transportation of ore at lower prices from Baltimore and Philadelphia than from New York and Boston.

The edge enjoyed by the two more southerly ports is attractive enough to turn most of the ore business to them, Boston and New York spokesmen complain.

Argue Rate Change

In partial response to a petition filed last March by the Port of New York authority, the ICC recently heard final arguments.

Questions posed during the arguments included these: Should rates from Boston and New York be brought down to the Baltimore-Philadelphia level? Should rates remain as they are?

Tax:

Treasury seeks extension of inventory adjustment.

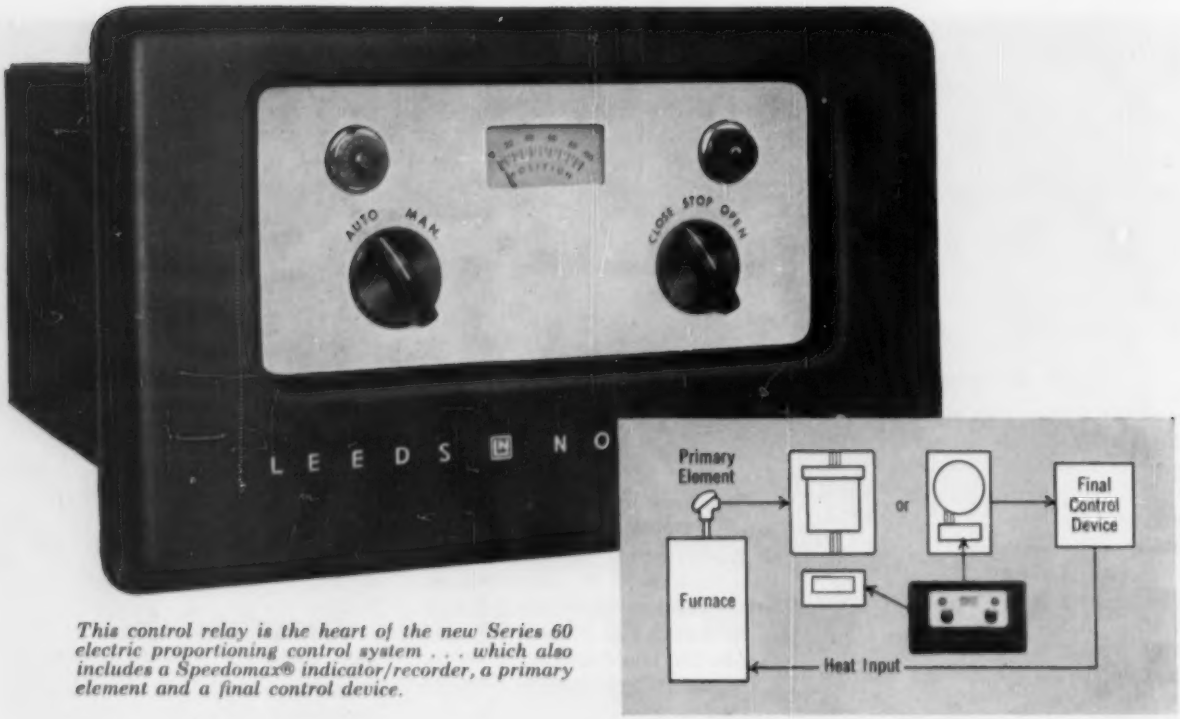
Congress will be asked to extend until Dec. 31, 1956, a tax provision that would aid manufacturing firms and other enterprises using the last-in-first-out (LIFO) method of accounting for inventory replacement.

This provision, allowing a tax adjustment where liquidation of certain inventories is followed by replacement, was scheduled to expire on Jan. 1. The U. S. Treasury Dept. is offering the extension proposal.

Inventories concerned were disposed of as a result of shortages created by the Korean crisis. Some of the items liquidated, such as copper, are still short, the Treasury Dept. notes.

Materials bought at top prices while the shortages continue would add to the tax liability of the buying firms. To reduce the pressure for replacement of inventories under present conditions, the Treasury Dept. considers the one-year extension desirable.

Treasury Secretary Humphrey states this position in letters to the House Ways and Means Committee and the Senate Finance Committee, which would be concerned with the extension.



This control relay is the heart of the new Series 60 electric proportioning control system . . . which also includes a Speedomax® indicator/recorder, a primary element and a final control device.

WITH THIS NEW SERIES 60 CONTROL

You can push your furnace HARDER

■ If you're wasting valuable furnace time bringing a *batch* to temperature . . . slowing down heating rate to prevent overshoot . . . Series 60's adjustable rate of approach will bring furnace to control point smoothly—safely—in shortest possible time.

If you're losing production on your *continuous* processes due to hot spots . . . slow start-ups . . . poor combustion, Series 60's sensitivity, speed of response and control actions will provide fast, uniform heat distribution within the furnace . . . head off temperature departures as soon as they start.

Regardless of your process, if your furnace, your product and your production isn't benefiting fully from your present controls, it'll pay you to look into Series 60.

COMPLETE, FLEXIBLE SYSTEM Heart of this flexible system is L&N's new, compact Series 60 electronic proportioning control relay which receives information from the Speedomax indicator/recorder . . . immediately amplifies it and adjusts the final control device to hold temperature in line. This control relay is only 6″ x 11″ x 11″—about half the size of the Series 50 unit which it replaces. It's an integral part of our new Speedomax H instruments . . . mounts in its own case when used with Speedomax G. Expendable components—tubes, electrolytic capacitors, etc.—are plug-in for fast servicing.

VARIETY OF CONTROL ACTIONS Series 60 is available for Position-Adjusting Type (P.A.T.) or Duration-Adjusting Type (D.A.T.) control.

P.A.T. regulates input by adjusting the position of a valve; D.A.T. provides a two-position operation of the final control device . . . regulates input by adjusting the durations of heat-on time of a contactor, or of full-open time of a valve.

P.A.T. is supplied for single-action (proportional) or 3-action (proportional, reset and rate) control . . . D.A.T. for two-action (proportional and reset) or 3-action control. Proportional regulates input according to *size* . . . reset according to *duration* . . . and rate according to *speed* of temperature change. Choice of type depends upon your product, your process and your production.

In the 3-action units, reset and rate operate independently—permit optimum settings for best possible control. Reset is adjustable from 0-100 repeats/min; first step above zero is .01. Rate time is continuously adjustable from 0-8 minutes.

For a full description of Series 60 control, contact your nearest L&N office, or write 4956 Stenton Avenue, Philadelphia 44, Penna.

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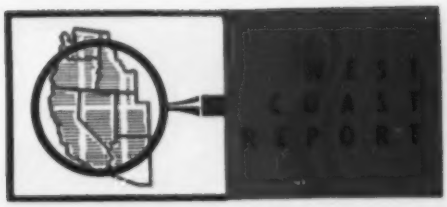


Coast Shipbuilding Outlook Bleak

Current expert opinions on shipbuilding programs for '56 are bearish . . . Some hope seen in private yard repair programs slated for after first of the year . . . Export step-up boosts scrap prices—By *R. R. Kay.*

◆ "DEPRESSING" is the best way to describe the feeling you get when talking to people in the West Coast shipbuilding and ship repair industry about 1956. "Immediate prospects are zero," one spokesman points out, to make sure it's understood what he means when he says "the outlook is bleak."

Another executive, in a voice sounding as if he's just in from a wake, says "things look pretty low." And he adds that, unless some new repair work comes along soon, "operations will drop off to nothing by February."

Repair Jobs Should Help . . . But this same man shoved aside the black crepe long enough to say, "There's a pretty good repair program scheduled for the West Coast private yards after the first of the year. If it materializes, we'll be able to hold our present employment of about 8500. Otherwise, we're sunk."

A top executive at Bethlehem Pacific Coast Steel Corp.'s shipbuilding division notes that its San Francisco yard expects the volume of repair work to drop about half in 1956 compared with 1955. No new contract awards for 1956 are on the horizon there, he says, although his firm does have contracts for two destroyer escorts.

Bethlehem's San Pedro, Calif., yard is in healthier shape and expects to hold its own next year at about present levels.

Regional Bids Needed . . . Most officials agree salvation lies with Uncle Sam. Some kind of bidding, on a regional basis, is the only solution.

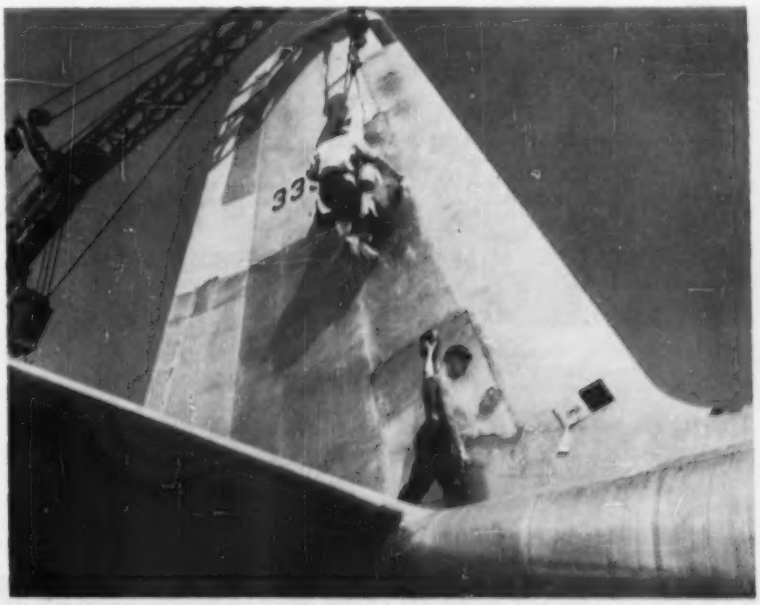
"West Coast yards can't get government jobs when they have to compete against Eastern yards," says Louis Ets-Hokin, chairman of Governor Knight's committee on shipbuilding and ship repair work.

Mario Grossetti, business manager for the Shipfitters & Helpers Local No. 9, San Francisco, whose union handles all ship yard workers on the coast, says: "It doesn't look good unless Congress does something in January. We can't even get crumbs when we have to compete against the Eastern yards." Congress should allocate work on a regional basis, he insists.

Even the outlook in the Navy yards is cloudy and not too hopeful. Puget Sound (Bremerton, Wash.) Naval Shipyard's force recently was cut. This may be a warning of more to come.

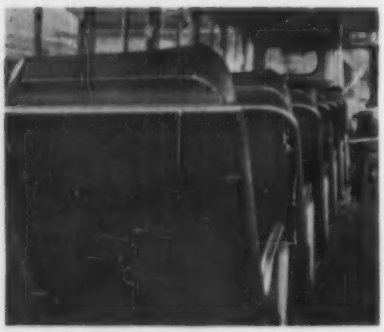
Export Boosts Scrap Prices . . . Renewed export activity shoved scrap prices up another notch.

Mills were paying higher prices on special deals to such an extent that the sub-rosa prices became general. They decided to face the realities of life by declaring the higher prices publicly.



BUFFING UP a new Air Force transport, the Lockheed C-130 Hercules, is a big job. Washwater contains chemicals to brighten metal, then is sprayed and buffed for protection against weather and exhaust fumes.

WHAT ? CAN ROTARY EMBOSSING DO FOR YOU



Reduce replacement costs? Eliminate frequent refinishing? Transportation companies report that embossed metal seat backs look better, last longer, conceal scuffs and scratches and eliminate the need for costly refinishing.

Add elegance and glamour to your product? Look at the interior appointments of modern automobiles! Dashboard trim, radio grilles and instrument panels are embossed for greater beauty. Embossing also diffuses reflected light for greater driver comfort and safety. Decorative strips on doors and sills are made both glamorous and durable through rotary embossing.

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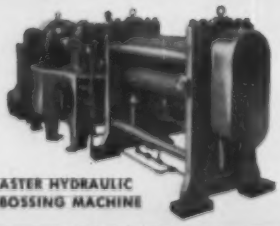
Rotary embossing can add to the value, appearance and strength of *your* product. Let MEMCO show you how. Write for complete information.



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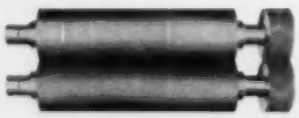

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MACHINE TOOL HIGH SPOTS

French Take Metalworking Inventory

Government is taking a look at metalworking potential . . . Believes manufacture and use of more machine tools is in national interest . . . May result in more exports for U. S. builders—*By E. J. Egan, Jr.*

◆ TOUGH FRENCH restrictions against importing U. S. machine tools have long had American builders fuming about this lack of reciprocity in so-called reciprocal trade agreements. But a new move to step up machining efficiency throughout France may eventually allow U. S. builders to get a collective foot in the door.

The French government is reportedly convinced that the manufacture and use of modern machine tools develops business that is in the national interest. And it aims to see what can be done.

Metalworking Census . . . First step is a nationwide census of metalworking equipment to be taken under the direction of the Ministry of Commerce. Preliminary estimates put the country's present machine tool total at 600,000 units. Technicians guess that half of these machines are over 20 years old.

Official census takers won't stop at a simple quantity tabulation of the various types of equipment. They plan to pinpoint the number, type and age of tools by industry classification, as well. From the distribution pattern that will be revealed, they'll spot quickly the progressive segments of industry, also those which have lagged behind in keeping up with the times.

For example, it is generally assumed that the French textile industry does a good job of replacing its obsolete machinery with automatic equipment. Likewise, the country's automotive and electrical equipment producers keep up with modern machining and manufacturing techniques.

Caught in Squeeze . . . But a host of other mechanical industries, caught between rising costs and fixed selling prices, are apparently unable to buy expensive new metalworking machines.

French machine tool builders are thought to be capable of tooling up their nation's backward plants to peak efficiency. Where they do not build the necessary equipment, they have import connections to draw upon.

But they can't tackle the job without orders. Witness the fact that French machine tool production, which climbed steadily from 1947 to 1952, has slumped off for the past three years.

The Results . . . So French builders are keenly interested when the Ministry of Commerce says it wants to enhance the skill of French artisans with modern tools. Any program aimed at achieving this goal would automatically pump new life into sagging machine tool production lines.

"Get me some pins—long ones to stick in the salesmen."

And if the program should be urgent enough, and on a wide enough scale, it could lead to liberalization of restrictions on imports of foreign tools. U. S. builders will unquestionably watch the situation closely.

Carbide Education . . . Routine of previous customer training sessions on the use and application of cemented carbide cutting tools will be altered and expanded by the Carboloy Dept. of General Electric Co. next year. Courses scheduled for the first half of 1956 will add three special sessions on milling cutter applications, and two special discussions on the use of carbides as wear-retarding components.

Milling . . . Milling sessions will feature grade selection, brazing, grinding, speeds, table travel and machine horsepower. They will also demonstrate step-milling and conventional techniques. Classes on carbide wear-retarding components will teach attachment methods, design considerations and grinding, and other pertinent procedures.

Other regular sessions will take up the use of the company's new machinability computer, and will include discussions and demonstrations of throw-away type carbide inserts.

MORE COPPER IS COMING

Never before has peacetime copper output been so great.

In 1955 alone, free world refined production totalled an estimated 2,732,997 tons. Yet even today's record tonnages will be exceeded as new copper mines swing into full production and existing properties expand operations.

On the African continent, substantially increased production is expected from Bancroft, Chibuluma, and Kilembe.

In South America, expansion at El Teniente, Chuquicamata and La Africana, has been announced. Under development are Cuajone, Toquepela, Quellevaco, and Indio Muerto.

In the United States (already the world's largest producer), San Manuel, Butte, Tripp, White Pine, Osceola, and Pima mines are headed for greater output.

Canada will add more production at Gaspé, Campbell Chibougamau and Opemiska. Many new properties are being developed. Substantial future output is expected from Brunswick, Geco, Granduc and Canam, to mention only a few of these new projects.

The copper industry has the capacity to produce copper faster than ever.

From known deposits . . . from mines now under development and from ore bodies now being explored . . . more copper is on the way. For particulars, write today to Copper and Brass Research Association, 420 Lexington Avenue, New York 17, New York.

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The Iron Age

SALUTES

E. P. Cunningham

He got his first job in the depression and worked up through a drafting room. It was rough going but he acquired a solid background for sales work. When he talks today, experts listen.

Clearing Machine's Gene Cunningham is a man who can speak as an expert before experts. His name on convention programs is familiar to metalworking men. He knows his product.

Gene came by his knowledge the hard, sure way. He graduated from high school in the black days of the early thirties. Jobs were scarce, even for experienced men, and he scrambled around trying to get started. His early career included a time as a Chicago theater manager. When a chance came to go with Clearing Machine in 1934, he jumped at it.

On-the-job training in those days meant making yourself useful enough to the company to hold your place in the thin ranks of the employed. Gene operated a blueprint machine, graduated to a drawing board, then became assistant to the chief draftsman.

His first sales job was related to the drawing board background—cost estimates and sales proposals. That was in 1940. By 1945 he had become assistant sales manager working out of Chicago. Two years later he transferred to Detroit and moved into the automotive press market. In another two years, he'd become Detroit office manager. He came back to Chicago as Clearing's sales manager in 1951 and became vice president of sales three years after that.

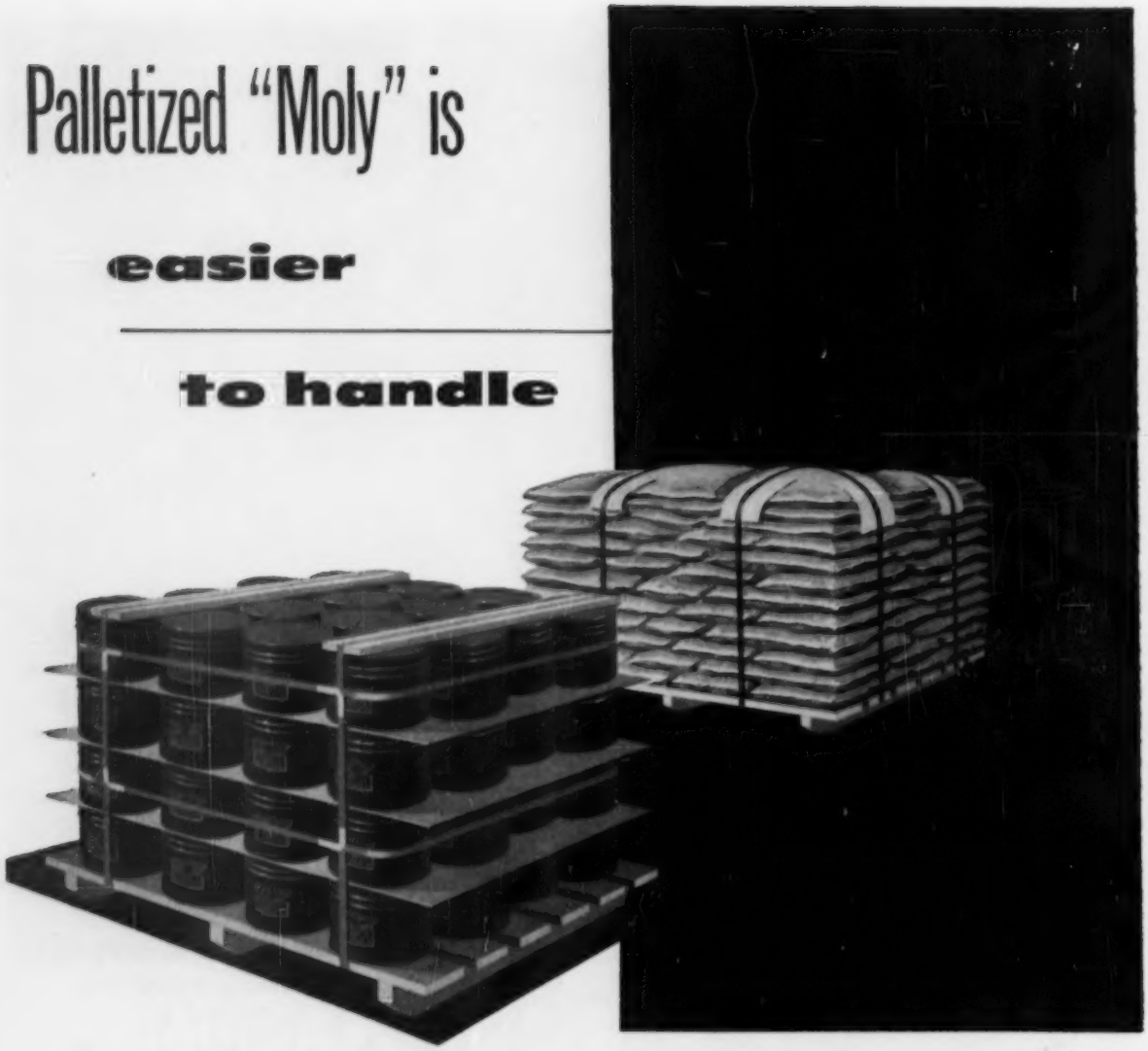
Born far down the Mississippi at Novington, Mo., Gene grew up in Chicago. Like many another native, he's moved into suburbs, living in Elmhurst, a city of 16,000 due west of the metropolitan area. He is married, has a teenage son, Roger.

Press business is traveling business. Gene's base of operations is Chicago but his range of travel includes the Orient and Europe. The respect he receives at all points proves the value of hard, fundamental schooling. College and high school graduates who find the way paved for them in planned training courses would do well to talk to men like Gene Cunningham before complaining. Experience gained the hard way still pays off.

Palletized "Moly" is

easier

to handle



Traditionally, molybdenum has been packaged in bags and cans, with weather conditions, storage, and equipment problems frequently resulting in an awkward handling situation for the steel manufacturer.

Now, MCA is first again in offering a standard wooden pallet, with either 100 bags or 64 cans steel-strapped securely in place. The full pallet is easily and safely moved by lift truck to storage location or direct to the furnace. The pallets are expendable, and but a small nominal charge is made to customers authorizing this form of shipment.

We are confident the new "Moly" palletizing system will more than justify your expectations.

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The Iron Age INTRODUCES

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J. Harris Ward, elected executive vice president, **Commonwealth Edison Co.,** Chicago.

Richard C. Newbold, appointed vice president, sales, **George F. Pettinos, Inc.,** Philadelphia.

W. G. Frank, named president, **American Air Filter Co.,** Louisville, Ky.; **W. M. Reed,** elected chairman to board; **Ben R. Shaver,** elected vice president, and treasurer; **E. G. Mason,** appointed secretary.

Evan Hopkins, appointed superintendent, Truck Dept., **Wheeling Steel Corp.,** Ohio; **Curtis H. Williams,** appointed superintendent, Warehousing and Shipping Dept.; **William Klotz,** appointed assistant superintendent, Warehousing and Shipping Dept.

Walter H. Jones, appointed assistant to general manager, purchases, Paint and Brush Div., **Pittsburgh Plate Glass Co.**, Pittsburgh; **William H. Welch,** appointed purchasing agent, Ditzler Color Div., Detroit.

Raymond Pontious, appointed assistant superintendent, Bolt and Nut Dept., **Bethlehem Pacific Coast Steel Corp.,** Los Angeles.

Warren C. Dunn, appointed assistant manager, General Apparatus Sales Dept., Union Switch & Signal Div., **Westinghouse Air Brake Co.,** Pittsburgh; **Edward R. Couch,** appointed manager, stationary compressor sales, Le Roi Div., Milwaukee.

Stanley E. Huffman, Jr., appointed district manager, **Pratt & Whitney Co.,** Rochester office, West Hartford, Conn.

William H. Somerwill, appointed superintendent, Ashtabula Plant, **Reliance Electric & Engineering Co.,** Astabula, Ohio.

Clayton K. Baer, appointed manager, Milwaukee sales branch, **Crucible Steel Co. of America,** Pittsburgh.

William E. Judd, appointed general manager, U. S. Machine Div., **Stewart-Warner Corp.,** Lebanon, Ind.

John R. Hewitt, named district sales manager, Boston, **Harbison-Walker Refractories Co.,** Pittsburgh.

Clark B. Frothingham, appointed district sales manager, Northern Illinois, **Adamas Carbide Corp.,** Kenilworth, New Jersey.

E. B. SUYDAM, appointed president, Linde Air Products Co., New York.

WILLIAM B. PIERCE, elected vice president, sales, Allegheny Ludlum Steel Corp., Pittsburgh.

DR. RUSH A. LINCOLN, appointed technical director, Allegheny Ludlum Steel Corp., Pittsburgh.

GEORGE B. MOSELEY, appointed vice president, sales, Chase Brass & Copper Co., Waterbury, Conn.

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Gilbert R. Semans, appointed assistant director, metallurgy and research, **Jessop Steel Co.,** Washington, Pa.

Robert J. Horning, appointed sales representative, New England, **Consolidated Machine Tool Co.,** Ansonia, Conn.

Joseph F. Beckman, appointed assistant director, sales, and manager, steel industry sales, **Signode Steel Strapping Co.,** Chicago.

Ralph W. Barnes, appointed customer liaison manager, Eastern Div., **Servomechanisms, Inc.,** Waterbury, Conn.

J. T. Vann, appointed technical director, **American Cast Iron Pipe Co.,** Birmingham, Ala.; **C. K. Donoho,** appointed assistant technical director and metallurgist; **Carl Farlow,** named chief engineer; **B. B. Warren,** named director, public relations; **Sam F. Carter,** appointed assistant works manager; **Ralph Carlson,** appointed melting superintendent; **James W. Moore, Jr.,** appointed assistant melting superintendent; **J. C. King,** appointed plant personnel director; **Sam Phelps,** named employment manager; **W. W. McCulloch,** appointed sales manager, special products; **T. E. Rybka,** appointed assistant sales manager, special products.

Sidney Oldberg, named director, automotive research, **Eaton Mfg. Co.,** Detroit; **Andrew S. Gill, Jr.,** named manager, Central Research Div., Cleveland.

Edwin H. Burke, appointed chief engineer, mills and machinery, **The Morgan Engineering Co.,** Alliance, O.; **Luther E. Romoser,** appointed chief proposal engineer; **George M. Hoffman,** appointed chief electrical engineer; **Irwin W. Evans,** appointed chief development and welding engineer; **Percy Stockberger,** named acting chief crane engineer.

LAWSON VAN RIPER, appointed vice president, Ansonia Div., The American Brass Co., Ansonia, Conn.

PAUL H. RICHARDSON, appointed vice president, engineering, The Hartford Special Machinery Co., Hartford, Conn.

EDMUND M. WISE, appointed assistant to vice president-manager, Development and Research Div., The International Nickel Co., Inc., New York.

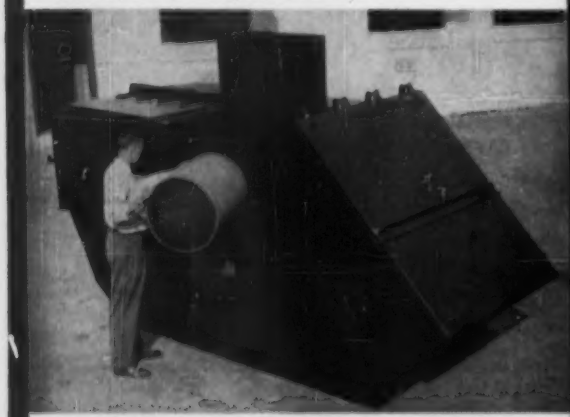
HUGH L. RUFFNER, appointed president, Pittsburgh Chapter, Institute of Scrap Iron and Steel, Pittsburgh.

COLLECT IT

AS IT ACCUMULATES — SOLIDS, POWDERS, SLUDGE, LIQUIDS
RAW MATERIALS, FINISHED PRODUCTS, WASTE MATERIALS

Heavy waste is dumped into an open container at a foundry in New York. The first step in the LOAD LUGGER SYSTEM of materials handling is to place a number of containers at strategic points to collect material as it accumulates, reducing handling at the point of origin.

Light material accumulates in an open container with high sides at a shipping carton plant in Louisiana. Rugged LOAD LUGGER containers are built of welded steel, have deep leak-proof bottoms, hold from 1½ to 14 cubic yards and more, and handle all types of material.



It is easy to load this 14-cubic-yard LOAD LUGGER container at a St. Louis contract hauler. It fills to the top without raking and is wind-proof and rat-proof. A model with rubber seals and latches is also theft-proof, fly-proof, dust-proof, and almost odor-proof.

PICK IT UP

ALREADY LOADED — NO LOST TIME AND NO LOADING CREWS
LET ONE TRUCK AND DRIVER DO IT ALL — REPLACING MANY

A full container is picked up at a refinery in Indiana. The second step in the LOAD LUGGER SYSTEM is for one driver and his truck equipped with a hoist-body to pick up full containers on a regular schedule. This procedure does away with lost time and loading crews and eliminates the need for several conventional trucks and their drivers.

A bearing manufacturer in Ohio picks up a full container of dolomite. LOAD LUGGER hoist-bodies (flat-bed truck bodies with a pair of hydraulic-powered hoisting arms) handle pay loads of up to 18,000 pounds and more. They are easily mounted on any truck chassis of suitable capacity, and all controls are installed in the cab.

An open container used for accumulating industrial wastes is picked up by a Chicago contract hauler. For greater safety, LOAD LUGGER hoist-bodies lift containers with four-point suspension and have double-acting hydraulic cylinders for positive control at all times.

LOAD LUGGER®

• FLAT-BED TRUCK BODIES WITH HYDRAULIC HOISTING ARMS
• LEAK-PROOF TILT-DUMP CONTAINERS FOR BULK MATERIALS

ENGINEERING B-W PRODUCTION

HAUL IT

IN MANY TYPES OF CONTAINERS — OR ON THE TRUCK BED IN PLANT AND OVER THE ROAD — ON YOUR TRUCK CHASSIS

A city truck in Ohio hauls a full container of repair materials. Government approval is evidenced by the many such municipal, state, and federal installations. Hauling full containers is the third step in the LOAD LUGGER SYSTEM, and over-the-road hauls are as feasible as in-plant because of the use of standard truck chassis.

A full container of residue materials is hauled at a corn products processing plant in Illinois. LOAD LUGGER hoist-bodies carry containers well forward for correct load distribution and cradle them between steel sidewalls for greater travel safety.

LOAD LUGGER hoist-bodies also carry materials or equipment directly on their flat beds, loading and unloading heavy objects with their hoisting arms.

This special hoist-body of a Michigan telephone company transports heavy cable reels. Such new uses for LOAD LUGGER equipment are constantly being developed.

DUMP IT

BY TILTING CONTAINER VERTICALLY OVER REAR APRON, OR DELIVER IT BY EXCHANGING FULL CONTAINER FOR AN EMPTY

Spent solvents are dumped into incinerator tank at a drugs and medicines manufacturing plant in Michigan. Delivering full containers or dumping their loads is the fourth step in the LOAD LUGGER SYSTEM. Returning empty containers then completes the cycle.

Metal scrap is dumped and spread in the yards of a scrap metals service company in Iowa. LOAD LUGGER hoist-bodies handle more pay load on a given truck chassis, because they are lighter than comparable equipment. And their patented simplicity, clean design, and sturdy construction make them cost less to buy and maintain.

Equipment of a Miami contract hauler in the dumping position. The LOAD LUGGER hoist-body has outrigger jacks to protect rear springs and axles from injury while picking up and putting down heavily loaded containers, but it neither needs nor uses these jacks while tilting container over rear apron to dump or spread the load.

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Alfred L. Trumpler, named promotion manager, **Harper Electric Furnace Corp.**, Buffalo, New York.

Don M. McPherson, named general manager, **Willey's Carbide Tool Co.**, Detroit.

Robert H. Etnyre, appointed plant manager, **The National Supply Co.**, Toledo plant.

J. M. Devers, appointed divisional director, marketing, **Food Machinery & Chemical Corp.**, Riverside, Calif.; **I. J. Blondon**, appointed general sales manager; **L. M. Emanuel**, appointed sales manager, fruit and vegetable industries; **Lee Harrel**, appointed manager, southwest district; **Newell Carter**, appointed manager, Santa Paula.

George Kastner, appointed to staff, **MacDermid Inc.**, Waterbury, Conn.

R. L. Coffey, appointed manager, Military Requirements Dept., Allison Div., **General Motors Corp.**, Indianapolis, Ind.

Herbert K. Kingsbury, named manager, product sales, centrifugal pump section, Norwood Works, **Allis-Chalmers Mfg. Co.**, Milwaukee.

Gerald M. Scheufler, named sales engineer, Chicago Reliance Div., **Eaton Manufacturing Co.**, Massillon, Ohio.

C. Coleman Fisher and **Dr. Watt W. Webb**, appointed to staff, metals research lab., **Electro Metallurgical Co.**, Niagara Falls; **Dr. Thomas A. Henrie**, appointed research chemist, chemicals research group.

Edgar W. Engle, named technical director, **Vascoloy-Ramet Corp.**, Waukegan, Ill.

William F. Christopher, appointed manager, market development, Chemical Development Dept., **General Electric Co.**; **Albert H. Gates**, named manager, manufacturing training, Manufacturing Services, Schenectady, New York.

Charles C. McCarthy, named manager, Aluminum Products, **Whitehead Metal Products Co., Inc.**, Cambridge, Mass.

Ellwood H. Spencer, appointed assistant general traffic manager, Supply Div., **U. S. Steel Corp.**, Chicago.

Edward J. Martin, appointed administrator of training, **Crucible Steel Co. of America**, Pittsburgh.

Paul Azzolina, named manager, Service Dept., Le Roi Div., **Westinghouse Air Brake Co.**, Milwaukee.

Edwin A. Regan, appointed New York district sales manager, **Republic Steel Corp.**

Herman Van Eck, appointed manager, Balemaster Manufacturing Div., **East Chicago Machine Tool Corp.**, Chicago.

R. A. Lemersal, appointed technical sales manager, **Midland Industrial Finishes Co.**, Waukegan, Ill.

Ferdinand A. Loebach, named manager, architectural sales, **Kaiser Aluminum & Chemical Sales, Inc.**, Chicago, Ill.

Michael Gladstone, appointed sales manager, **Alloy Precision Castings Co.**, Cleveland.

Thomas B. Splehr, appointed general manager, Aviation Div., **Pheoll Mfg. Co.**, Chicago.

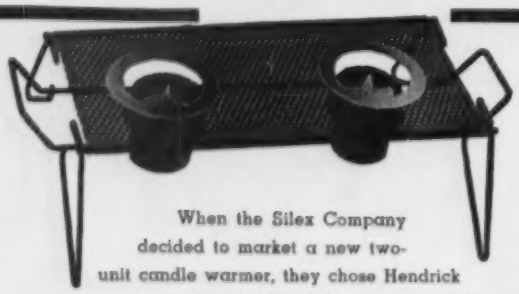
Martin A. Prince, appointed product manager, **Servel, Inc.**, Evansville, Ind.

Tom L. Kalahar, named sales manager, **Sterling Hardware Mfg. Co.**, Chicago.

Silex Selects . . .

Hendrick Perforated Metal

for its new Coffee-Casserole Warmer



When the Silex Company decided to market a new two-unit candle warmer, they chose Hendrick Perforated Metal for the basic fabricating material. For Hendrick Perforated Metal not only helps increase a product's overall attractiveness, but it increases saleability as well. Select from hundreds of attractive designs in commercially rolled metals and gauges to suit your more exacting requirements.

Hendrick
MANUFACTURING COMPANY
37 DUNDAFF ST., CARBONDALE, PA. • Sales Offices in Principal Cities
Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

This company made

PERSONNEL

Roy A. Hall, appointed manager, Tank and Boiler Head Sales Div., **Ackermann Manufacturing Co.,** Wheeling, W. Va.; **Paul Custer,** appointed general foreman, Cold Roll Dept., **Wheeling Steel Corp.,** Beech Bottom, W. Va.

R. R. Klinge, appointed chief chemist, Massillon Steel Plant, **Republic Steel Corp.,** Cleveland.

Richard H. Latimer, named plant superintendent, **The Colson Corp.,** Elyria, Ohio.

Woodrow L. Lacey, appointed district manager, West Coast Coupling Div., **Sierbath Gear & Pump Co., Inc.,** North Bergen, New Jersey.

Ralph P. Sharp, appointed district manager, California branch, **Union Twist Drill Co.,** San Francisco.

Phillip C. Coulter and **Glen R. Solomon,** appointed executive assistants, Military Products Div., **International Business Machines Corp.,** New York.

Harry J. Hartz, appointed district manager, **Conoflow Corp.,** Philadelphia; **William E. Hagen,** appointed district sales engineer.

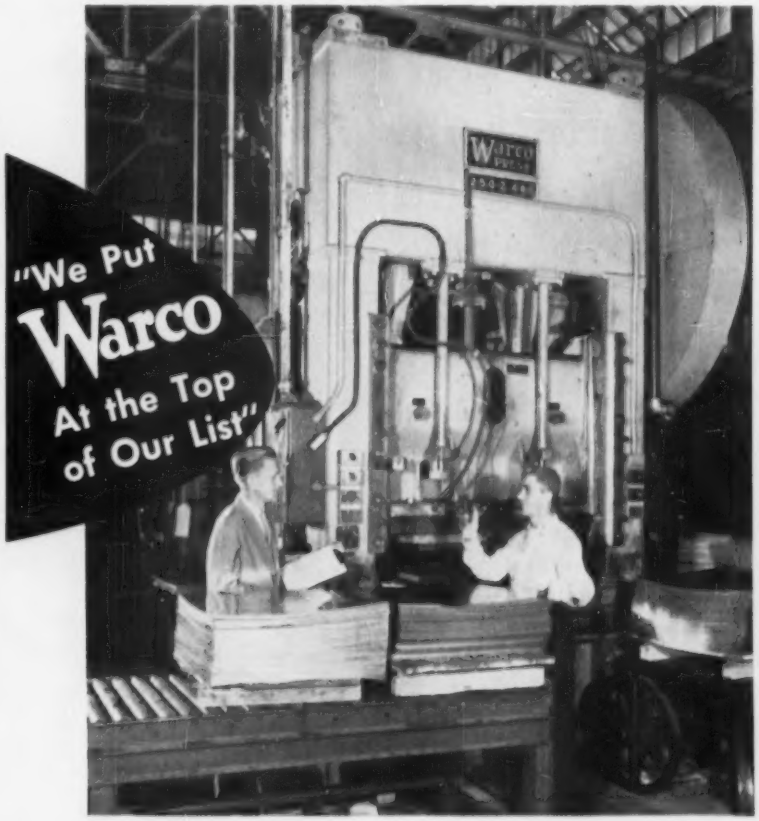
Howard Brown, appointed divisional sales engineer, **E. H. Titchener & Co.,** Binghamton, New York.

Maurice B. Keady, Jr., appointed manager, metallic molybdenum sales, **Climax Molybdenum Co.,** New York.

George E. Piper, Jr., appointed director, product and market research, **Keystone Steel & Wire Co.,** Peoria, Ill.

William F. Arnoldy, named application engineer, Aircraft Sales Div., **Townsend Co.,** Santa Ana, Calif.

Vincent C. O'Hara, named manager, Cleveland District credit office, American Steel & Wire Div., **U. S. Steel Corp.,** Cleveland.



Nesco Plant Manager Gives Efficiency, Economy and Ease of Operation as Reasons for Selecting Warco Presses

"I would say that our experience with Warco equipment has been very satisfactory. We have many of these presses in our factory and are well satisfied with their operation. I feel that from the standpoint of efficiency, economy and ease of operation that Warco equipment is right at the top of our list." This from Martin M. Fisher, Plant Manager of the Nesco Division of New York Shipbuilding Corp., one of the nation's foremost producers of quality housewares.

Mr. Fisher's comments are echoed wherever Warco presses are in operation, for when users compare, they invariably find Warco performance to be superior.

If you are not already operating Warco equipment, why not let us put you in touch with someone who is? We know once you've talked with a Warco user, you'll be certain to add our name to your press supplier list.

-Federal- WELDERS

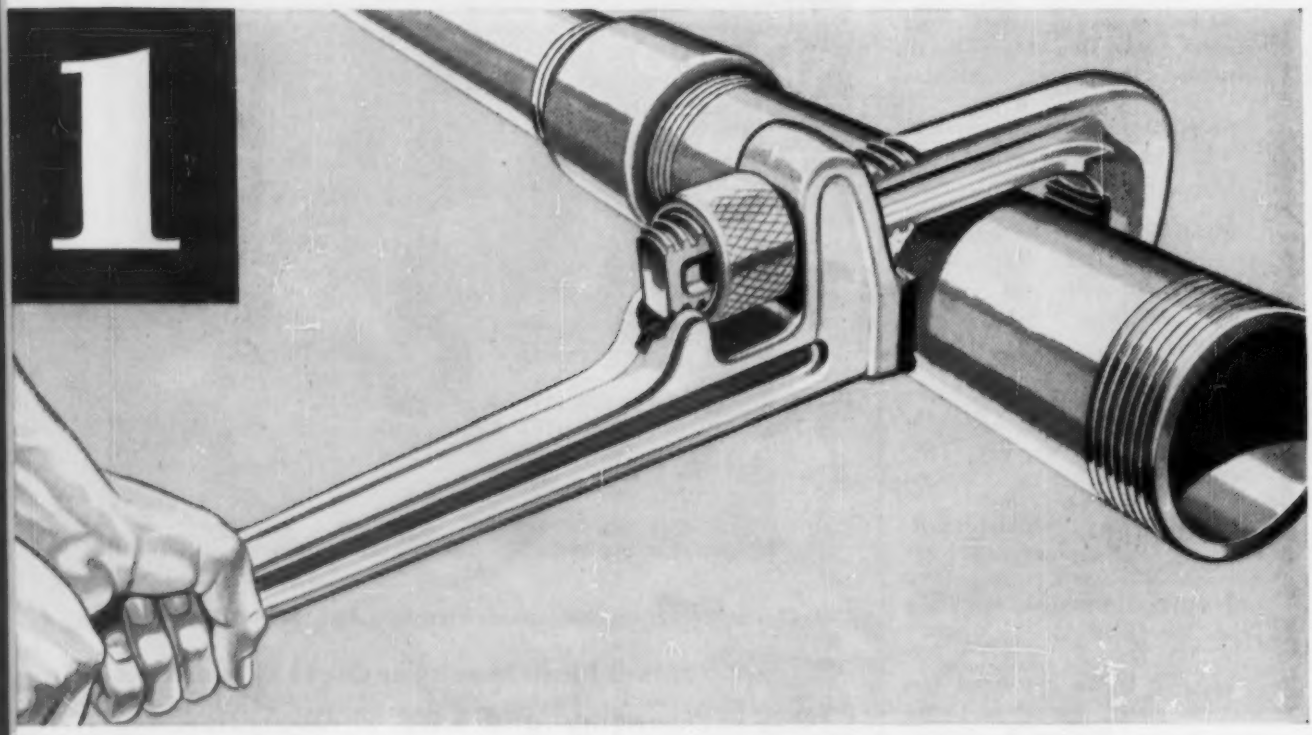
Warco PRESSES

The Federal Machine and Welder Company

WARREN, OHIO

This company gets strong

This company made a better product with the help of Alcoa's Development Division



International Forge Company makes a better pipe wrench

They used to call these 3-foot pipe wrenches "man killers". That was before aluminum reduced their weight from 20 pounds to only 8.

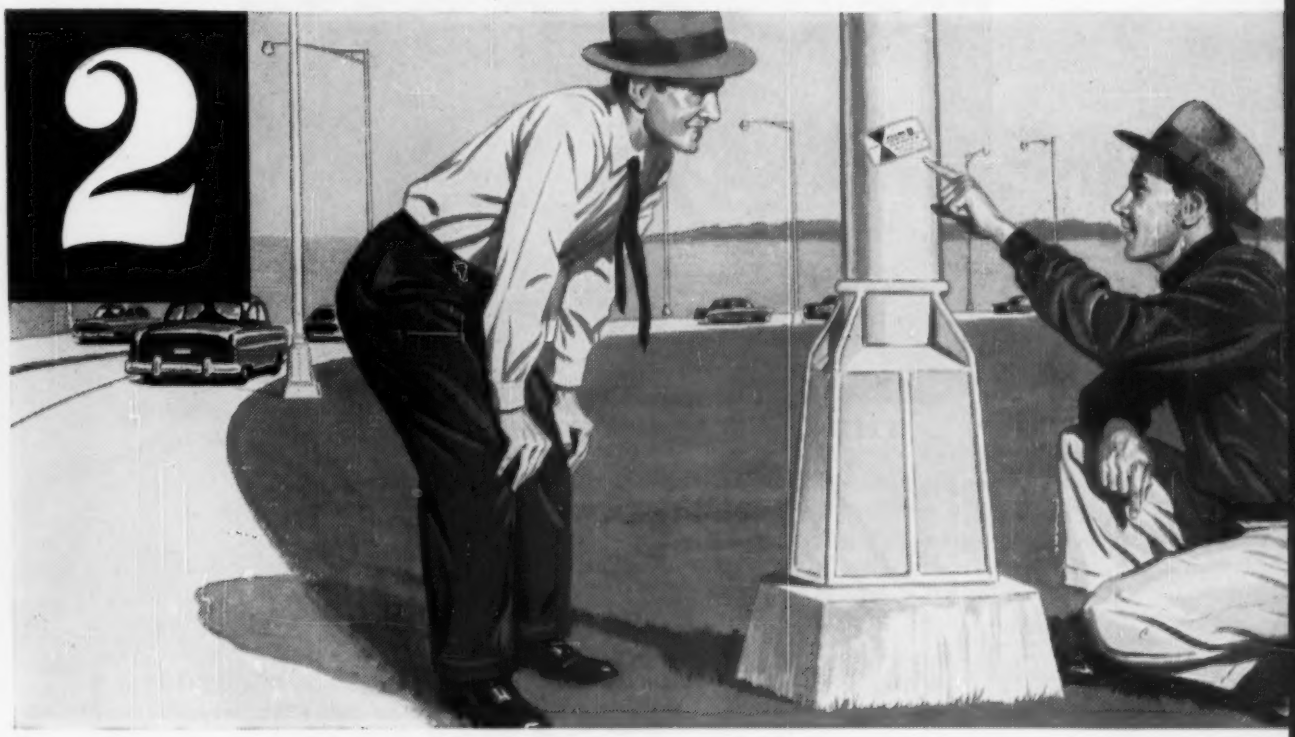
International Forge Company set out to improve pipe wrenches to the nth degree. Their engineers designed a complete set of wrenches as aluminum forgings, in sizes from 10" to 36". For strength, the head section of each aluminum wrench had to be larger, yet still compact enough to be used in close quarters.

At Alcoa Development Laboratories, sample wrenches were made with varying head sizes. Each sample was carefully torque-tested and the resulting strains analyzed with electronic strain gages. Alcoa engineers were able to show International Forge Co. the exact design that combines maximum lightness with the strength of steel.

This "revolution in the wrench business" could apply to your business, too—with important competitive results! Experience gained from thousands of such projects is available to you through Alcoa's Development Division. Making your *product* perform better in aluminum could be our *next* job.

DEVELOPMENT DIVISION
ALUMINUM COMPANY OF AMERICA

This company gets strong marketing support with the help of Alcoa's Labeling Program



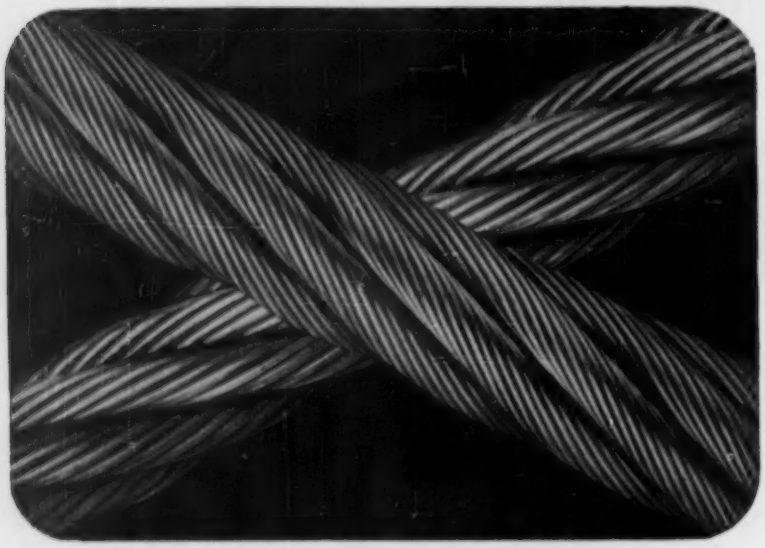
Pfaff & Kendall adopts Alcoa Label

Pfaff & Kendall, Newark, N. J., pioneers in the production of corrosion-resistant lamp standards for modern highways, made of Alcoa Mill Products. Signing the Alcoa Labeling Agreement enabled Pfaff & Kendall to use the powerful Alcoa label with their own well-known name. The combination assures purchasers of their standards that here is a product with an aluminum pedigree. Thus Pfaff & Kendall shares in the millions of impressions of the Alcoa label that will appear in national magazines and on television in 1955.

The accumulated recognition of the Alcoa name, which for 67 years has stood for the finest in aluminum, is available to Alcoa mill product customers with their use of the Alcoa label. Complete plans and detailed advantages of its use are available from the Alcoa office nearest you, listed under "Aluminum" in your classified phone book.

Your Guide to Aluminum Value

FIRST WE DEVELOPED 1105 ROPE WIRE.



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WIRE 1105 ROPE

1105 takes Royal Blue out of the ordinary wire rope class.

1105 is a rope wire that's new—that's stronger. It's the biggest news in many years.

1105 is the result of more than a century of research and development—it's the wire that gives Roebling Royal Blue the stamina that pays off in service.

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IronAge
FOUNDED 1855
TECHNICAL ARTICLES

Simplified machine does it—

Down Come Aluminum Casting Costs

◆ Many foundrymen would question the economics of producing large aluminum castings in permanent molds . . . But it is being done successfully and economically with a simplified machine on both long and short run parts.

◆ Low-cost molds are precision cast, giving castings unusual accuracy, freedom from porosity and uniformity of surface finish . . . Except for minor touch up and machining of the parting line, molds are used as cast . . . Castings weighing up to 70 lb are now in production.

By W. G. PATTON, Engineering Editor

◆ A SIMPLIFIED casting method now makes practical the production of large, comparatively short run aluminum castings in permanent molds. Castings up to 70 lb have already been made and it is apparent that castings weighing 100 lb can be produced by this method at competitive prices. Castings weighing only a few ounces have also been produced by this method at rates as high as 6000 per day.

The process, developed by Rapidscast Corp., Grand Rapids, Mich., features: (1) fast and economical tooling using precision cast alloy iron molds, (2) dimensions held to less than 0.010 in. on most castings, (3) unusual flexibility in tooling, permitting the use of sand cores and chills where required, (4) close control of solidification, (5) low unit labor cost, (6) high production per unit of floor space and (7) high production per dollar invested.

Successful use of the process centers around a unique, low cost casting machine. It has many features of a diecasting machine except that metal is hand poured instead of being injected at high velocity into the molds.

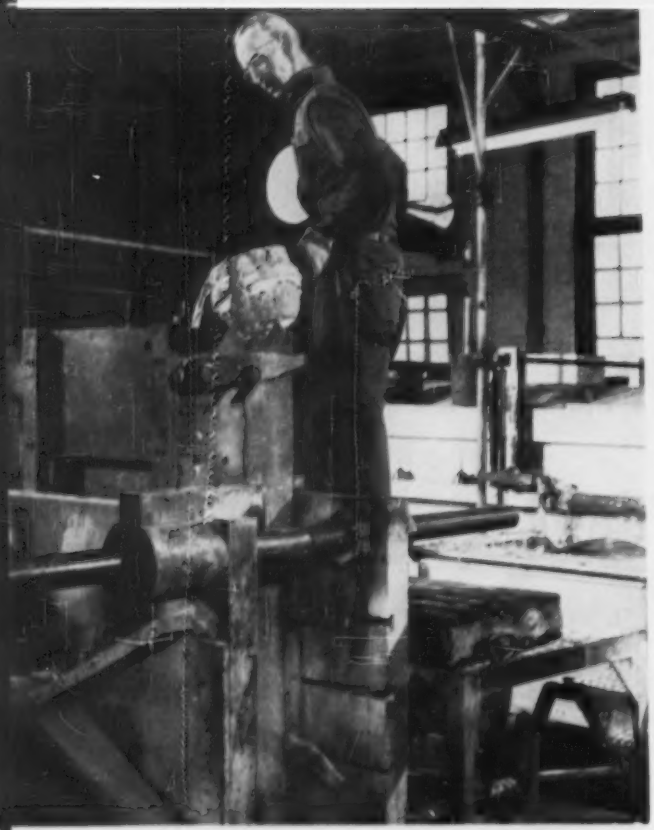
Another important difference is the use of gray alloy iron molds that are precision cast to required tolerances. Except for minor polishing or touch up, and machining of the parting line, molds are used as cast. The comparatively low cost of molds is a major reason why this new process can compete with gray or malleable iron casting, or diecasting, for many applications.

The casting machine is essentially a four-post press with strong, sturdy posts and tie bars. Since pressure injection of metal is not used, toggle locking is not required. The machine has a single fixed platen and, a mating moving platen. Thick, heavy cast iron molds are attached to these platens. T-slots simplify the problem of accurate positioning and attaching the molds securely to the plates.

The moving platen runs on rollers on a steel rail. Because of the heavy construction of the machine, locking pressure is considerably higher than that used for most permanent mold casting machines. This is helpful in producing highly accurate castings.

In contrast to most permanent molds, those used in the Rapidscast machine are very heavy. No attempt is made to core or machine the molds to uniform thickness. Their mass minimizes warpage due to unequal heating. Castings 56 in. long have been made in these heavy molds to a tolerance of ±1/32 in. in major dimensions.

Another feature of the Rapidscast technique



CASTING MACHINE with precision-cast permanent molds somewhat resembles a rugged four-post press. Pouring is carefully controlled; slow pouring often being a distinct advantage.

is the method of gating. The solidification rate being much faster than for sand casting, gating has been designed to meet these conditions. Metal pours to the bottom of the mold, passing through a choke down sprue into a reservoir or pool. Metal is then tapped from the bottom of the pool into gates which are generally at the side of the mold.

Compared to diecasting, the pouring rate is slow. However, since relatively high pouring temperatures are used, the metal flowing into the die cavities is very hot.

Except under certain conditions, a ceramic coating is applied to the molds to decrease the cooling rate of the metal and to prevent the metal from sticking to the mold. The coating is sprayed onto the molds during the third shift of each day. Although a single application usually lasts for two work shifts, it can be renewed whenever necessary.

Thickness of the coating varies from 0.006 in. to no coating at all. A heavy coating is applied when slow cooling is desired. To get a chilling effect, the coating is applied in a very thin layer or rubbed off. Sodium silicate in the ceramic coating mix gives it good adhesion.

Sections as thin as $\frac{1}{8}$ in. can be poured in most cases without taking special precautions. Where large, heavy sections are adjacent to a thin section, a minimum section of 5/32 in. is desirable.

As in the case of sand castings, vents are often used to assure proper filling of a die cavity. Metal or sand cores may be used.

Aluminum alloys are generally heated to the high side of the 1300° to 1600°F range, using a double chamber heating method. Pouring is done as slowly as possible. Using a high pouring temperature and a slow pouring rate, solidification of the casting may take place during pouring. Thus, the bottom of a heavy section may be solidified while the top is still feeding. Ratio of metal poured to the trimmed casting will vary with design. However, a recovery of 60 pct is not unusual. Some castings, such as long thin parts, may require a very extensive gating system to assure proper feeding. An advantage of the comparatively high yield percentage is that production can be undertaken with a minimum of aluminum melting capacity.

Most of the castings made at Rapidscast have high silicon content which contributes to good pouring properties. Copper and magnesium are the most widely used hardening agents. Two of the alloys, Alcoa 319 and 333, are used in the as-cast condition. Alcoa alloys 355 and 356 are heat treatable and offer a substantial boost in yield and tensile strength with some sacrifice in ductility. Some difficulty may be encountered in pouring high-manganese and high-zinc aluminum alloys in permanent molds.

Both collapsible and hard sand cores are used. Metal chills, when needed, are of cast aluminum plate. If metal cores can be withdrawn, they are attached to the slides.

Under some circumstances, it is possible to pull back a portion of the mold to withdraw the casting more easily. While adding to the mold cost, use of this method may make it possible to produce castings in permanent molds that could not be produced otherwise.

Warping cut with multiple ejectors

A cam or horn arrangement, similar to that employed in diecasting, is used to withdraw the cores. The slide is generally anchored to the moving half—or the ejector half—of the mold while dowels are anchored to the stationary half.

With long, thin castings, use of multiple ejector plates eliminates or minimizes warpage when the casting is removed from the mold. Ejector pins are attached to a heavy steel shaft to minimize possible distortion due to heating which might misalign the pins.

An exceptionally smooth as-cast surface can be obtained by locating this surface away from the gate. This eliminates the need for spraying since the chilling action of the hot metal

Some Properties of Permanent Mold Cast Aluminum Alloys

	Alloys		
	319 and 333	355T6	356T6
Tensile Strength, psi	34,000	43,000	40,000
Yield Strength, psi	19,000	27,000	27,000
Elongation, pct	2.0	4.0	5.0
Hardness, Bhn	90	90	90
Castability	Good	Better	Best

against the bare die gives the surface its high finish.

Uniformity of finish is an outstanding characteristic of permanent mold aluminum castings. Through the use of chills and other techniques, exceptionally good finishes can be produced by the Rapidscast method.

Tooling takes little time. Starting with an accurate wood pattern, a plaster reproduction is then made. The parting line is established at this time.

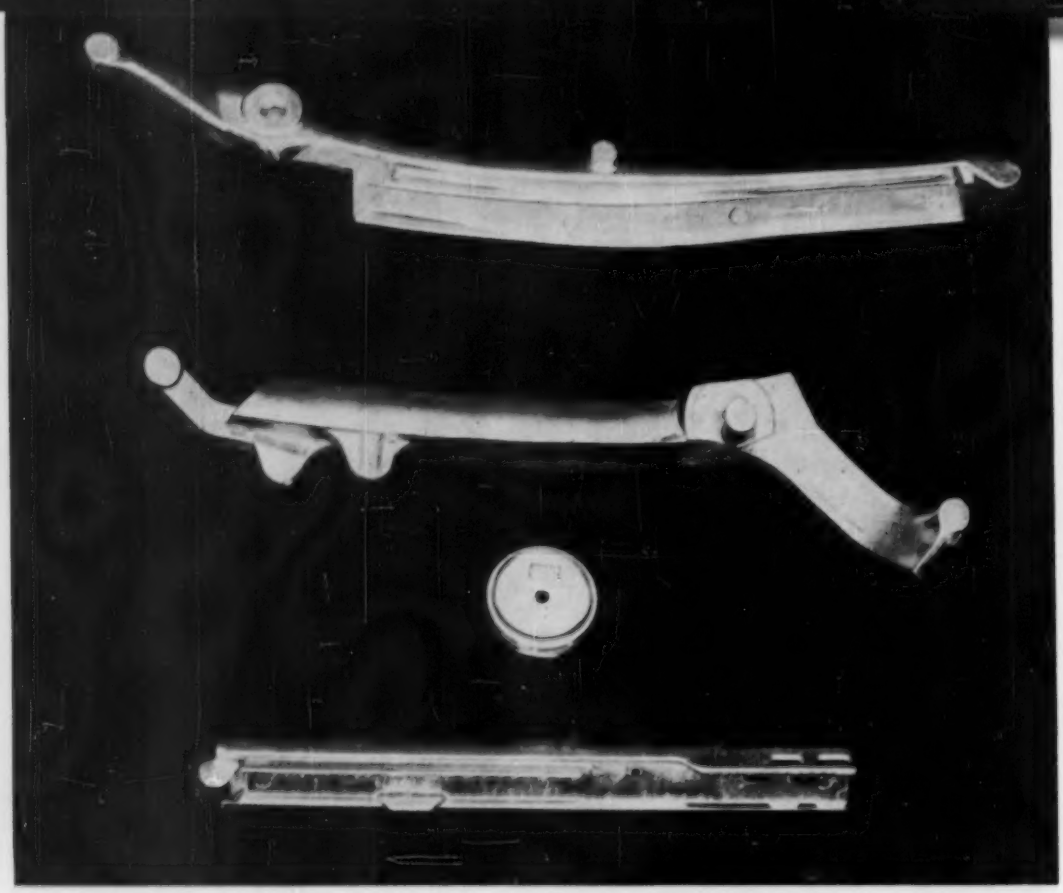
Using the plaster model, permanent molds are made by the Engineered Castings Div. of American Brake Shoe Co. from a highly alloyed iron. Die cavities are sufficiently accurate as cast to require only minor polishing and touch up. The only machining required is final locating and machining of the parting line.

The smoothly machined edges of the molds effectively seal them and minimize flash. Die life is excellent, some molds having been used for more than 300,000 parts without any major repairs.

Precision cast gray iron dies, particularly those having a deep cavity, may cost as little for the finished die as the material cost of a tool steel die. Moreover, expensive machining operations required for steel dies are eliminated. It is estimated that tool cost in some cases for the Rapidscast process is as little as one-sixth the tooling cost for diecasting.

Production rates are about half, and sometimes less, than for most diecast parts. There are, however, some compensating factors that often result in unit labor costs that are com-

PRECISION casting weighing 15 lb and measuring 54 in. long checks out in fixture. Casting process eliminated several former problems in holding dimensions within close limits.



THESE CASTINGS are typical of quality, accuracy and uniformity of finish obtainable by permanent mold technique. Critical dimensions are held within a few thousandths of an inch.

parable to diecasting. It is often possible, for example, for an operator to run two or more Rapidscast machines.

In such cases, output may be brought into the range of a single diecasting machine. Yet, the cost of two sets of molds will still be less than half of the cost of tooling for diecasting. The two permanent mold casting machines will cost less than one-third as much as a diecasting machine.

A 15-lb aluminum casting of Alcoa 356-T6 typifies how the permanent mold process can solve a warpage problem. The casting is used in an automatic Pinspotter built by American Machine Foundry Co. When made as a sand casting, it was difficult to hold the cored holes for the cross bars in proper relationship. Warpage was as much a problem as shrinkage.

Using the permanent molding technique, core shifting has been eliminated. All relationships are fixed and held by the heavy cast iron mold. These castings are now being held within 1/32 in. on straightness and flatness. Angular holes are held so they can be bored square and parallel within 0.012 in. per ft.

Another aluminum permanent mold casting now in production is a gear case housing for a 20,000-lb winch. Its outside dimensions are 14 x 20 x 8 in. and it weighs about 70 lb. Yet, a 12-in. dimension between two moving parts in the mold is held to within ± 0.010 in.

Present equipment limits the maximum size of castings to about 100 lb. Based on center distances, the size limit is 40 in. wide by 31 in. deep by 20 in. thick. This limitation does not apply where the mold extends laterally beyond the platen.

Close tolerances can be maintained across partings and between slides and mold. Rapid changes in section can generally be handled but it is best to avoid them if possible. Unusual soundness and improved accuracy has eliminated considerable machining on parts previously made by sand casting.

While the process is particularly suitable for medium and long-run large castings, the production of comparatively large runs of small production castings is possible. Tooling for small parts, may be simplified by making a single master part and using this single part as a pattern to produce all other cavities in the mold. As many as 20 or even 30 parts can be included in a single permanent mold.

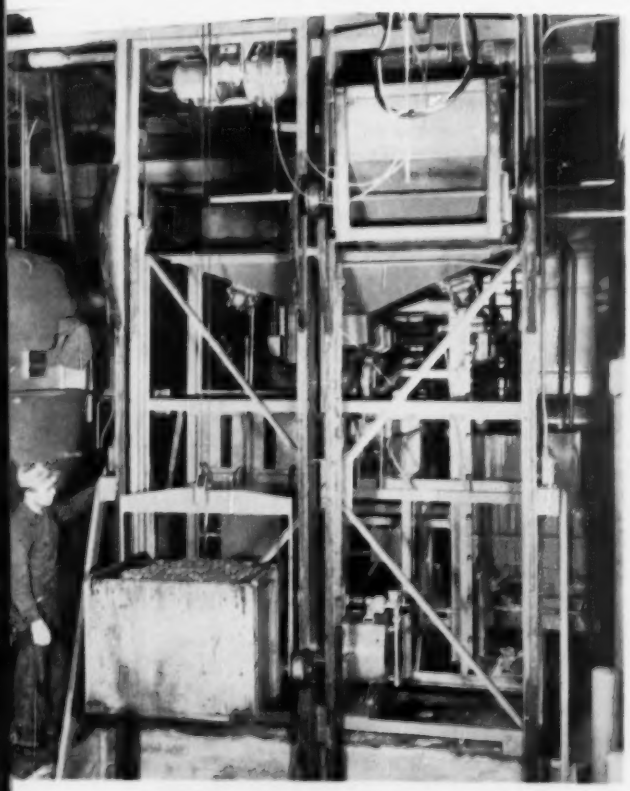
Molds can be set up in less than 15 minutes. After setup and spraying, molds are heated to 700°F before pouring takes place.

Barrel Plating Setup Combines High Output With Versatility

◆ High volume production, good quality and low production costs often are held incompatible with maximum flexibility in plating . . . Seriously challenging this opinion is a new plating system handling 20,000 lb hourly.

◆ Plate thicknesses are altered about every 15 minutes without production loss . . . Required thickness is achieved by a dial-type device that automatically trips electrical circuits, immersing each 500-lb batch into from 6 to 20 plating stations.

By G. W. HARDING, President, Harding Mfg. Co., Detroit, Mich.



DUAL hopper is loaded from two bins simultaneously. Screws, nuts, etc., to be zinc plated are fed automatically into a reservoir, which in turn loads into a weighing bin.

◆ PLATING to batch-load specifications at 20,000 lb an hour is not as contradictory as it sounds. Moreover, it's being done in a new barrel plating system designed to change plating specifications every 1½ minutes without delay or loss of production. In actual practice, thickness of zinc plate is altered at least once every 15 minutes to meet varying customer specifications.

Dial-a-spec control is part of the answer. The operator simply turns a dial wheel to pick the plating combination meeting customer requirements. Dial control determines whether the zinc plate will be 0.00015-in. thick, 0.0005-in. thick, or almost any figure between. Tumble barrels may swing down into each of 20 plating stations, or into as few as six, depending on the dial setting.

Manual handling is completely eliminated. Parts are automatically loaded in 500-lb batches, carried through the multiple-station plating process, then automatically unloaded, dried, weighed, and packaged. Four men handle the setup. The equipment occupies a space 63 x 15 x 9-ft high, and is housed in a 40 x 100-ft room.

Goal of Harding Mfg. Co., Detroit, was to acquire maximum productivity in conjunction with optimum flexibility. Ability to cope with rapidly changing customer requirements was essential. Despite an increased number of customers, length of individual plating runs at Harding is decreasing rather than increasing. As customers became more aware of quality standards, they tend more and more to set up their own zinc plating specifications. Jobs com-

SMALL parts are automatically weighed within ounces, then dumped in 500-lb lots into a tumble barrel. Operator adjusts dial wheel on barrel to attain proper plate thickness.

ing through the shop normally range from 0.00015-in. to 0.0005-in. plating thickness. Parts include virtually the entire fastener group (nuts, bolts, washers, stampings) up to a maximum length of 6 in.

The Udylite Corp., Detroit, furnished the plating equipment, including minor modifications to accommodate special flexibility features of the setup. Special devices eliminate manual handling operations, control quality and assure personnel safety.

The entire system comprises 42 stations, including 20 plating stations, of which six operate at all times. The remaining 14 plating stations can be turned on or off by the operator standing on the loading platform.

Merely by turning a dial affixed to each plating barrel mechanism, the operator provides for the necessary number of electrical contacts as the barrel moves through its cycle. Plating cycles are changed, on the average, about every 15 minutes.

If plating is required at a station, electrical contact is made automatically. If plating is not needed, the barrel is immersed in the bath but no plating takes place.

The system is used for zinc plating only and is designed to operate at 60 cycles hourly, 20 hours a day. Normal operating rate is about 40 barrels an hour at 500 lb per barrel, or 20,000 lb hourly.

At present, the system is run at a relatively high 18 v. For maximum efficiency and to maintain desired plating thickness and quality, a total of 1500 amp is regularly put through the work at each station.

A 75-ton refrigeration unit is combined with a steam source to keep plating solution temperatures within $\pm$ 2°F, winter and summer, day and night. The solution is constantly pumped from all three plating tanks through this heat exchanger.

Dwell time in each plating bath is normally the same. Plating rate can be controlled to some extent by varying the electric current but this factor is usually held constant. By varying the load (and sometimes the time), any desired variation in the plating rate can be achieved.

Before work is taken to the plating department, a job ticket is made out showing weight, number of barrel loads required, and number of plating stations to be used. A copy of the job ticket accompanies the work.

Two skip hoists raise the work into position for loading a single hopper. This hopper is a reservoir feeding the plating barrels. It is equipped with three vibrators which cause the work to flow constantly toward an opening in the bottom.

The feeder-hopper is also equipped with a chute-type vibrator tied in with a scale. The vibrator has two solenoids. Where a 500-lb load is to be weighed, the vibrator automatically operates at a fast rate until 460 lb is attained. The vibration continues, but at one-quarter the previous rate until the load reaches 500 lb. Using this fast-slow cycle, weight of each load going into the plating barrel can be held within a few ounces.

Cam closes circuit

Each plating barrel carries a special cam. When a barrel reaches the loading station with the cover off, a trip mechanism contacts this cam. The barrel stops in loading position, and closes an electric circuit.

A hydraulic mechanism is actuated, inserting the loading chute into the opening of the plating barrel. This closes a second circuit and drops the bottom of the pre-weighed load. Work feeds into the barrel by gravity.

Meanwhile, the operator on the loading platform removes the job ticket. Assume the order calls for 6000 lb. This is divided into 12 loads of 500 lb each. The operator selects a group of 12 consecutively-numbered colored chips. No. 12 chip is attached to the first load, No. 11 to the second, etc.

This system effectively controls the work, and indicates progress on a given job. The smaller the number, the closer the load is to the end of

the run. About 40 different sets of colored chips are provided. Each time a job is changed, the color of the chip is changed. Both solid colors and color combinations are used.

After selecting a colored chip for identification, the operator sets the all-important dial which is the outstanding feature of the machine. Let us say instructions call for plating at 10 of 20 plating stations. By turning to the tenth number, the work goes through the first 10 stations without plating, for no electrical contact is made. Starting with station 11, electrical contact is made. Plating occurs at each of the remaining stations, thereby giving the desired zinc plate thickness of deposit. This setup continues unchanged until the operator again moves the dial control.

Lighted panel spots machine activity

By glancing at a lighted control board, the operator can tell at all times whether or not the system is operating. A series of white lights indicates that each generator is on. A series of green lights tells when the electrical contact closes at each plating station. Another set of red lights show if current is actually being fed through the work at each station.

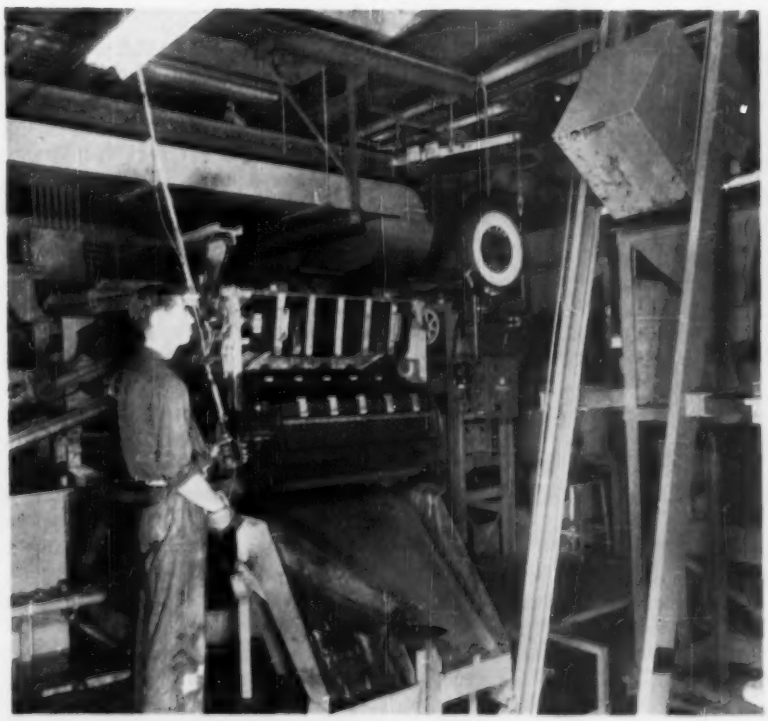
After passing around the entire cycle, work is automatically unloaded into a single hopper. Through a baffle arrangement, this station loads either to a zinc plating drier or a dichromating machine.

A rotating Ranschoff drier operates at 350°F and a rate of 4 rpm. Work remains in the drier approximately 4 minutes. The skip hoist feeds into a hopper equipped with a vibratory conveyor. The vibratory feed assists in spacing the work evenly as it goes into the drier. Work moves along a screw-type baffle as the drier rotates, and is unloaded at the other end of the machine by another vibrator.

Feeding mechanism on the dichromating equipment is of similar design. The dichromate unit consists of a series of 11 baskets, each with a capacity of 500 lb. The cycle includes automatic rinse, dichromate, a setting station, rinse and 6 drying stations. Parts are unloaded at the opposite end of the machine.

After zinc plating or dichromating, parts are dumped into special hopper gondolas that feed an automatic weighing and packaging machine. In the weighing machine, the hopper acts as a skip hoist, and dumps the load into a stationary hopper equipped with a dual vibrator.

Approximately 90 pct of the load required is vibrated at the fast rate. The last 10 pct is vibrated at the slow-feed rate. Flow of parts stops automatically when the desired weight is reached. Nearly all plated work is shipped in cardboard containers.



ZINC-PLATED parts are automatically unloaded, dried, weighed and packaged, after immersion in from 6 to 20 plating stations, plus other stations conventional to plating lines.

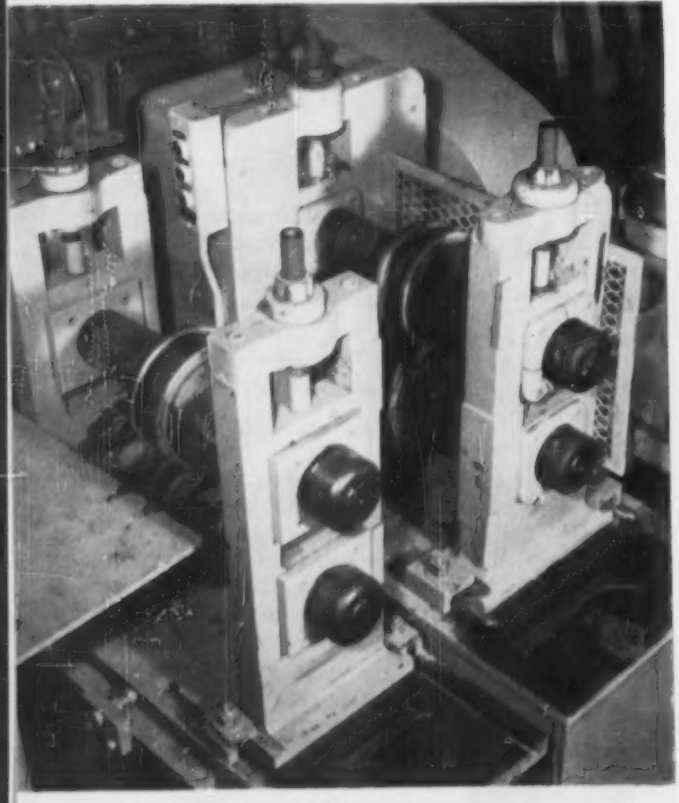
Get long runs—

Water-Lubricated Wood Rolls Bevel Aluminum

◆ Sometimes, you can save substantially by giving your tool designers a free hand . . . This home-grown, two-stand machine forms aluminum on short production runs that previously tied up 10-stand equipment.

◆ Laminated wood rolls lubricated by water have beveled more than a million parts with only minor resurfacing . . . A later degreasing operation has been eliminated . . . Standard design cuts maintenance, helps interchangeability.

By A. F. SCHUB, Assistant Supervisor.
Tool Design Dept., Douglas Aircraft Co., Inc.,
Santa Monica, Calif.



BEVEL FORMED aluminum is precision rolled on home-made 2-stand equipment with standard components. Metal feeds from right rear, through rolls, to table in left foreground.

◆ VALUABLE production time on a 10-stand progressive rolling machine has been saved by transferring a second aluminum forming operation to home-grown, two-stand equipment. A development of the Douglas Aircraft Tool Design Department, the low-cost machine also eliminates a degreasing operation. Water-lubricated male rolls of laminated wood are used, which with only minor resurfacing, have formed more than a million aluminum aircraft parts to accurate contours.

Conventional design advantageous

Costs are reduced even further by conventional design of the two-stand machine, eliminating the need for special parts. Standard parts are used wherever possible to permit interchangeability with other forming machines, and to reduce maintenance. Machine downtime while wood rolls are redressed does not exist, for a duplicate set is built into the equipment.

At the Santa Monica Division of Douglas, one structural shape is common to a number of aircraft sheet aluminum components. It is a rolled piece with a cross-section similar to that of a derby hat, hence is called a hat section. The

rounded part, corresponding to the derby's crown, is more or less common to all parts. But the form of the base (the "brim" of the derby) is critical and must conform to limitations of the attaching area.

Shop practice routes the slit aluminum stock through a 10-stand Yoder progressive rolling machine for the standard shape. These runs may be classed as production runs by aircraft standards. After preliminary forming, the sections are degreased, dried, then heat treated in a salt bath. Next step is stretch leveling to set the sections.

Tooling inexpensive

Ordinarily, the succeeding operation would be through a multiple-stand machine (10-stand Yoder or equivalent) to a specific edge form. This requires a degreasing and drying phase before later precipitation heat treat.

Roll form tooling is not inexpensive. Downtime for tooling change is a cost item to be closely controlled. Thus every effort is made to keep costs of any second forming operation to a minimum. Since these precision runs are necessarily short, cost control is exceedingly important.

A beveling roll machine has been designed and built to reroll sheet metal hat sections after solution heat treat and stretch leveling and prior to precipitation heat treat. The machine consists of two stands of male and female rolls.

The first stand is salvaged from one that had made sections for a part on an earlier model. Only revision for this stand is a diameter reduction on both roll shafts. Shafts are turned down from 3 in. to 2.813 in. diam. Bearings of the outside frame are bushed accordingly. This permits standardizing bore sizes with the progressive rolls on 10-stand equipment.

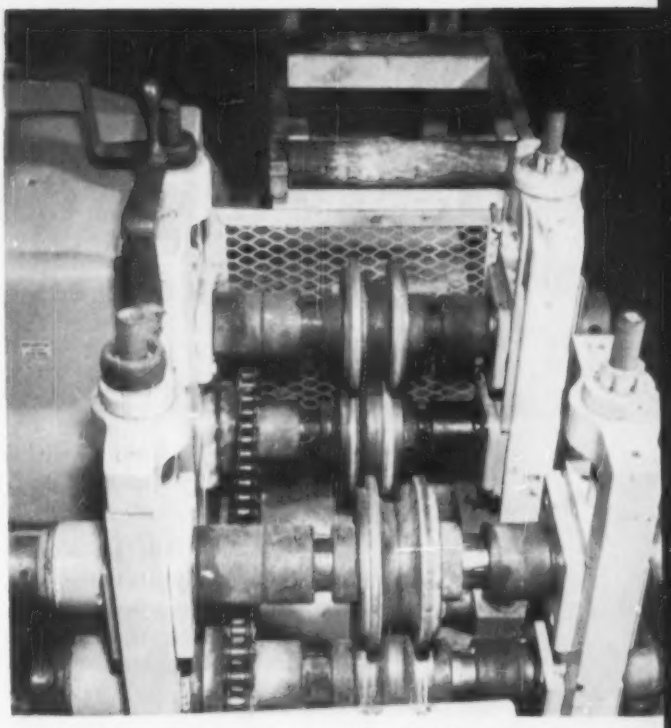
Machine speed increased

All curving mechanism has been removed from the original equipment and replaced by the second stand. Attachment points of the curving mechanism are used to eliminate excessive rework of the original equipment. For uniformity, the design follows the same general pattern of the first stand for all adjustments and bearings, where possible.

The power is transmitted from the first stand to the second by a chain and sprocket drive. To increase machine speed, positions of the driver and driven pulley have been reversed.

Laminated wood rolls employed for the hat-shaped sections involved are supplied by Parkwood Laminates, Inc. The material eliminates lubrication and has proven satisfactory. Rolls are classed as expendable because of severe usage.

Ends of the rolled strip aluminum have imprints from the stretch level jaws. They also are distorted in those areas by the heat treatment. In passing through the bevel roll machine, these imperfections chip and damage the wooden rolls.



MALE forming rolls are laminated wood, allowing water lubrication and eliminating a degreasing operation. With minor resurfacing, the rolls have formed more than a million parts.

Roll damage could have been eliminated by specifying hardened steel rolls. But steel rolls need lubrication. Degreasing would then be required, along with associated extra handling.

To date the Parkwood rolls have formed over one million components. With minor resurfacing they will continue to produce satisfactory parts. Only lubrication required is an occasional application of belt dressing and a continuous drip of water to keep the rolls moist. A duplicate set of rolls backs up the design of each hat section so the machine is not idle while the working set is redressed.

The 10-stand Yoder rolling equipment is released from a second stage operation by the two-stand machine. The roller is sufficiently compact to fit handily in present department layout, enabling a substantial space saving over the square footage that would have been required for another 10-stand machine.

On a phosphating line—

Does Full Mechanization Pay in Low-Volume Production?

◆ Standards people sometimes raise dubious eyebrows at the thought of applying automation techniques to any but mass production lines . . . Yet, this fully mechanized metal treating line fully paid for itself in a year, despite irregular production and low volume.

◆ Results so encouraged a paper machinery manufacturer that the firm now phosphate coats many components previously painted . . . Money previously spent in shipping the material elsewhere to be surface treated is sufficient to pay the entire cost of the operation.

By JOSEPH COOPER, Methods & Planning Engineer, Lodding Engineering Corp., Worcester, Mass.

◆ AUTOMATION pays off even in low volume installations. One New England firm manufacturing paper machinery hit a somewhat unexpected jackpot when it installed a fully mechanized phosphating line to treat 12-ft long steel bars. Despite irregular production requirements and a relatively small number of parts to be phosphated, the automated metal treating line fully paid for itself in one year.

Original intent was merely to reduce manufacturing costs and to decrease shipping delays that were upsetting production schedules. Previously, bars were shipped 40 miles from the plant for phosphating. Money saved by eliminating just these shipping and handling charges pays for cost of operating the treating line.

A side benefit showed up when the mechanized line proved so efficient that open production time became available. Lodding Engineering Corp. now phosphate-coats many other paper machinery parts that formerly were painted. In addition to cutting manufacturing costs, the coating provides added protection.

Encouraged, the firm also began phosphating its nuts, bolts and screws, which were cadmium-plated earlier. Now it purchases low-priced bare hardware, thus increasing its savings by the cost of the plating. It also has been possible to reduce inventories as a result of installing the line.

The phosphating process is essentially standard, and consists of:

1) A cleaner tank with proprietary concentrate strong enough when heated to 180°F to free the metal of oil film.

2) A rinse tank circulating water at room temperature, and controlled to start circulation when the load is immersed.

3) A stainless steel tank containing an iron phosphating solution heated to 200°F.

4) A second water rinse tank similar to the previous one.

5) A chromic acid tank heated to 170°F and containing about 7 oz CrO_3 per gal.

6) A tank of water-displacing, rust inhibiting oil.

Tanks built for large loads

In initial discussions between Lodding and the designer-supplier, E. F. Houghton & Co., Philadelphia, it became apparent that the tanks must be designed to accommodate as many 12-ft blade holders as possible in one load. Consequently, the tank is approximately 14-ft long, 14-in. wide, and 30-in. high. The loading rack

holds 32 blade holders, with clearance at both sides and ends of the tank.

To realize the benefits of full automation, all heating tanks are designed with covers that lift during the loading cycle. The covers also close after immersion, reopen when the load is lifted from the tank, and close after the lifting operation.

Tanks are heated with seven 5-kw circular immersion units. Heat losses are minimized by 2-in. foam glass insulation on both covers and tank walls. Temperature is closely maintained by a sensitive thermostat.

Immersion time is controlled by accurate timers. Fluid is kept at a predetermined level by a float and solenoid-operated valves.

No operator is needed once the process starts. As a load of steel is lowered to the cleaning tank, the cover opens automatically and closes after the load is immersed. At the end of the cleaning cycle, covers open and the load is raised. It hovers over the tank for a short drain period before moving automatically to a water rinse tank. The process continues automatically through the sixth tank, after which the hoist returns to start position. There it is unloaded and reloaded for the next sequence of operations.

Guided electronically

The automated line employs microswitches, timers, and solenoid valves to guide the material through its various cycles. A master pushbutton starts movement of the load over the first tank. There a microswitch stops it in the correct position. When the microswitch holding circuit for forward movement is broken by a timer, a contact is made simultaneously that starts downward motion.

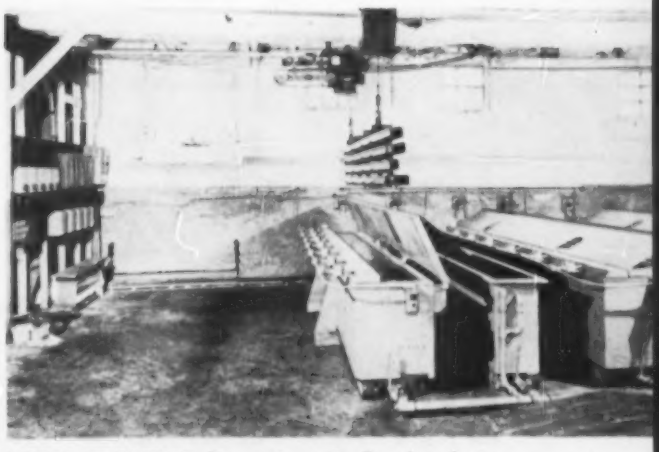
As the downward motion continues, a timing cycle is initiated limiting the duration of immersion. At the same time, the tank cover opens to allow the load to enter. Simultaneously, a timer chain sets the mechanism in motion that stops downward movement and closes the cover after the material has entered.

On completion of the cycle, the timer actuates the timing chain, which first opens the cover, then stops the elevating motion. After a drain period determined by a second timer, that starts simultaneously with the first, forward progress of the load begins anew. The same process is continued throughout the cycle.

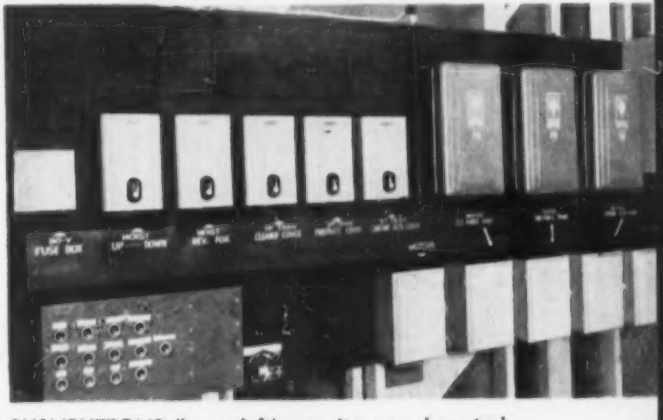
The only other controls required are two solenoid valves to initiate flow of water in the rinse tank when the load stops directly over it. Water continues to flow until the unit is moved to the next tank.

Manual operation of the treating line is accomplished by means of push buttons. The buttons bypass the automation mechanism.

The entire installation cost considerably less than one year's bills for phosphating from the previous outside sources.



METAL TREATING line automatically phosphates steel parts up to 12-ft long in a six-step operation. Cycle time varies from 5 to 15 minutes, depending on size, condition of parts.



PUSHBUTTONS (lower left) permit manual control of process, and bypass timers, solenoid valves and microswitches governing precise cycle. Process time is readily altered.

INSULATED tanks hold heat with 2-in. foam glass. Adjustable timer (right) controls cover-lifting mechanism. Thermostatically controlled temperature improves quality of coating.

Saves 2 hours per piece—

Reverse Grooving Eliminates Double Chucking

◆ ELIMINATING a double-chucking operation in grooving a steel casting is saving a power shovel manufacturer two hours per piece. A special leader and follower arrangement is employed, but no accessory equipment is necessary.

The steel cable drum is designed so that one cable winds while the other unwinds. This calls for two sets of grooves, one right-hand, the other left-hand. Each cable end runs through a cored slot near the ends of the drum and is secured inside.

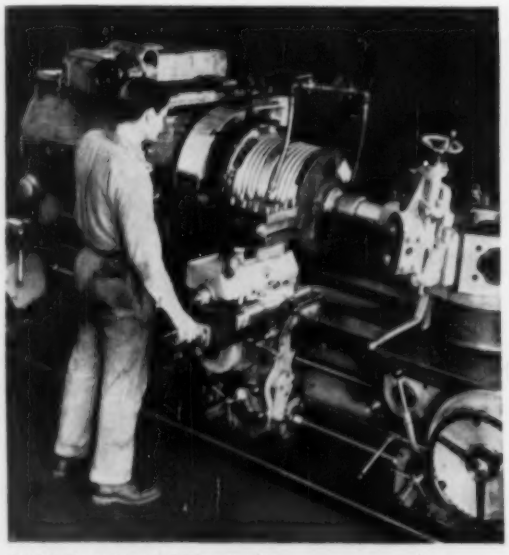
Both left and right hand grooves are completed in a single chucking, saving a full two hours per piece.

Chucked inside for twin cut

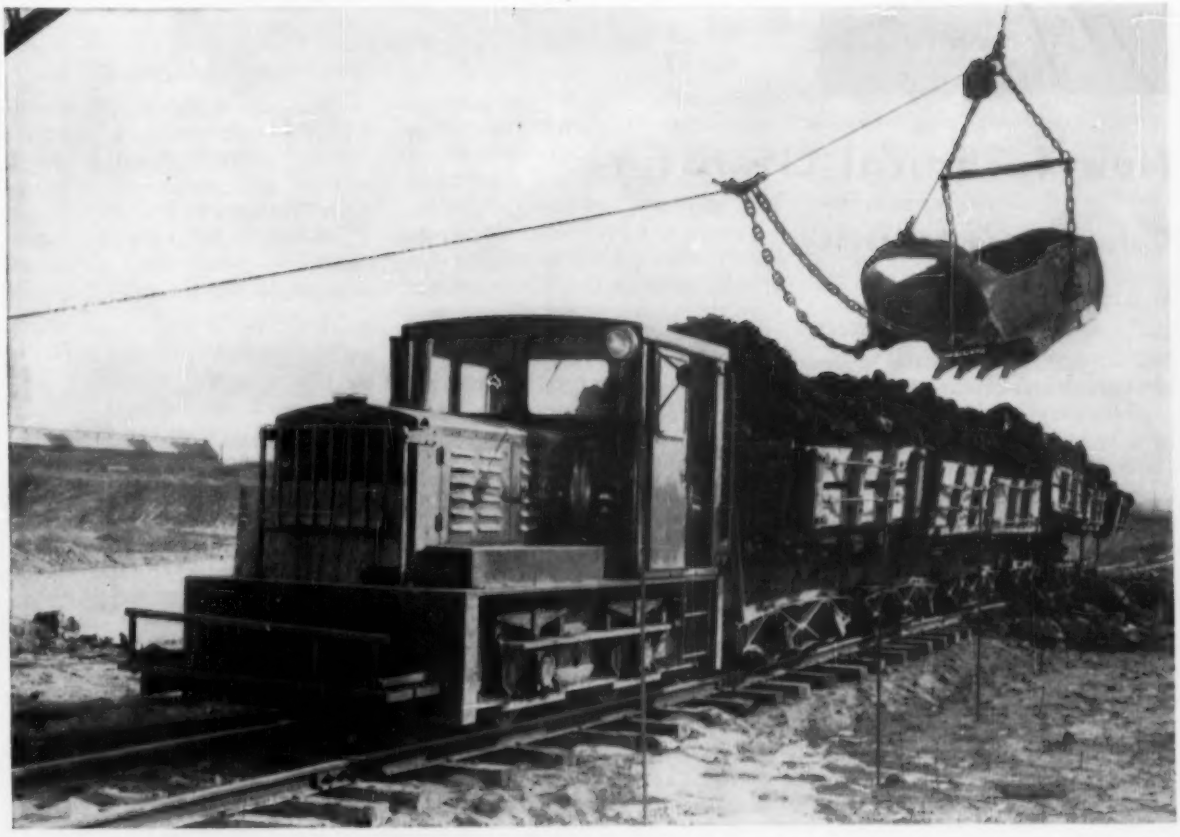
The steel drum is chucked on the inside with a Gisholt four-jaw combination chuck and is supported from the turret with a live center. The grooving tool on the square turret tool post is run in to depth in the cored slot. Then the spindle is started and the cross-slide carriage is given a special, very coarse feed.

At the end of the groove, the operator stops the spindle and reverses the carriage feed to turn the other groove. Stopping action must be accurate and virtually instantaneous to prevent the grooves from running into each other. This is accomplished with a Warner electric spindle brake that stops the work within less than a ½ in. of the center of the locking or returning groove.

The grooving tool also machines a radius on the lands. Other turret tools bore, turn and face the hub.



RIGHT AND LEFT windings on rope drum are turned without interruption on turret lathe with special leader, follower arrangement.



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New Technical Literature:

Catalogs and Bulletins

Aluminum panels

The advantages of nesting or interlocking aluminum panels for superhighway signs are described in a brochure just published. In the booklet the extruded aluminum panels are claimed to make possible greater speed, convenience and ease of handling in highway sign erection, as well as offering much longer maintenance-free service. Included in the brochure is a typical bill of materials for a 7½ x 15 ft sign, along with a table of mechanical properties of the components. *Reynolds Metals Co.*

For free copy circle No. 1 on postcard, p. 77

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 77.

Engines

A new 8-page bulletin describing two industrial engines has been published by the Le Roi Division of Westinghouse Air Brake Co., a manufacturer of high-output internal combustion engines, portable air compressors, stationary air compressors and air tools. The 3-color bulletin uses 40 halftones, charts, drawings, and diagrams to illustrate the design, performance, and economy of these two engines, which operate on gasoline, natural gas, or LP gas. The bulletin shows engine applications and lists specifications and available optional equipment. *Le Roi Div., Westinghouse Air Brake Co.*

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Hydraulic presses

A complete line of hydraulic presses for industrial use is given in a 6-page folder. Photographs and specifications are included on units for straightening, forming, drawing, blanking and bending, as well as on four column presses, closed side presses, heavy-duty presses, adjustable bed gap presses and a variety of shop presses. *K. R. Wilson, Inc.*

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Furnaces, generators

A new catalog of descriptive fact sheets bound in convenient file folder form is available on a line of heat treating furnaces and atmosphere generators, both electric and fuel fired. Described and illustrated in the catalog are exothermic and endothermic generators, ammonia dissociators, sulphur towers, dryers, tool hardening and tempering furnaces, shaker hearth furnaces, horizontal conveyor furnaces, inclined hood conveyor furnaces, pusher furnaces, strip annealing furnaces, car bottom furnaces, available accessories and miscellaneous equipment. Specifications are stated. *Sargeant & Wilbur, Inc.*

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the growing trend in tooling

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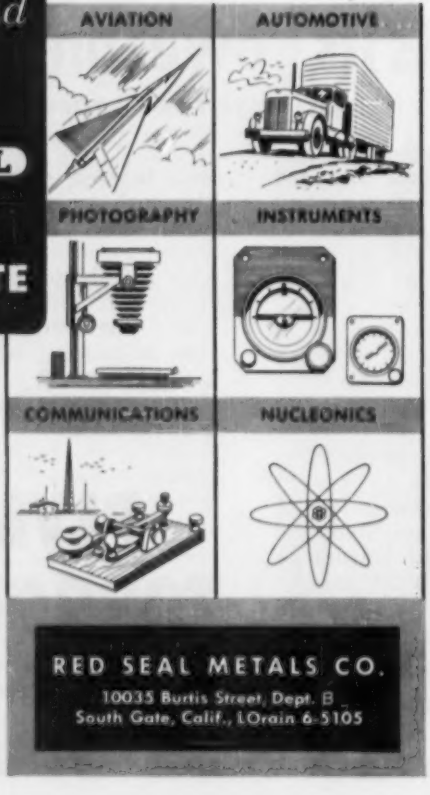

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Balancing machines

A new catalog by a producer of balancing machines discusses advances in the field which are designed to improve machine maintenance work and production techniques. It suggests a method of improving performance of overhauled or repaired machinery and parts, by eliminating mechanical failures and increasing efficiency with balancing. *Bear Mfg. Co.*

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Chlorine compounds

A new 48-page book, "Organic Chlorine Compounds," has just been published. The book discusses the applications of 18 products, their solvent properties, and their proper handling and storage. It includes important data on physical properties, specifications and test methods, shipping information, and constant boiling mixtures. Fourteen charts contain useful physical property data. The compounds are described as excellent solvents for hydrocarbons, alkaloids, and synthetic rubber. They are used in the manufacture of pharmaceuticals, adhesives, plasticizers, surfactants, lubricants, emulsion and foam breakers, resins, and other useful compounds. They are also used as fumigants, freezing-point and solubility depressants, and cross-linking and hardening agents. An important feature of this book is a list of references that gives additional sources for more detailed information on compounds. *Union Carbide and Carbon Chemicals Co.*

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Transformers

A new 32-page catalog describes a complete line of control transformers. Including autotransformers, machine tool transformers, and special application models, the illustrated publication is designated GED-2767. It contains ratings, dimensions, product features, and model numbers. Also included are list prices, weights, and wiring diagrams. A special section shows panel and machine tool voltage regulation curves for use in selecting the proper transformer for given applications. *General Electric.*

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Testing

A catalog on proving rings certified to National Bureau of Standards specifications LC-822, Morehouse Bulletin No. 116 describes and diagrams the working principles of both compression-type and tension-type proving rings. A proving ring is a circle of elastic steel, equipped with a micrometer screw and a highly sensitive vibrating steel reed. When the ring is given either a tensile or a compression load, its very minute deflection may be accurately measured. Various applications are pictured, and details are given of the ring dynamometer and weighing and calibration system. *Morehouse Machine Co.*

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Crane controls

Bulletin CE-400 describes and pictures control systems which may be incorporated with existing cranes for modernization. Seven control panels are illustrated and discussed in detail. *Ederer Engineering Co.*

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Trackmobile

Full details on a heavy-duty trackmobile—a new freight car mover that operates on railroad track or road—are given in a recently published 16-page broadside. It contains many in-use photographs of the trackmobile hauling, spotting and switching cars and gives engineering information, explanations and illustrations of features. The broadside explains the trackmobile's method of gaining traction for handling many loaded freight cars, as well as its method of converting to rubber-tired wheels for track and on roadways. *Whiting Corp.*

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Hose fittings

A 4-page folder describes and pictures a line of detachable, leakproof fittings and Teflon hose. Design features of the fittings and photographs showing the method of assembling them are included. *Aeroquip Corp.*

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The operation being performed by our nurse suggests good-naturedly that you can cut out time-consuming tasks like drilling and tapping, through-bolting and hand welding. You can fasten it better at less cost with the NELWELD® method of end-welding studs to steel. Your monthly copy of the NELWELDER will keep you up to date on the latest short cuts in manufacturing and construction. Mail us the top of this advertisement to start your free subscription to the NELWELDER.

NELSON STUD WELDING
Division of Gregory Industries, Inc.
LORAIN, OHIO

Construction

A new 28-page illustrated catalog describes a standardized system of building construction. The catalog presents for the first time a description of the company's new "F" buildings, a versatile series of flat-roof structures. There is information on the rigid-frame "A" series, offering clear spans of 100 feet and over; the "B" series, center-column buildings where large clear spans are not required; the "C" series, clear spans with crane runways, and the series of standardized hangars and other airfield facilities. The catalog also describes the company's wide choice of standard door and window combinations, of collateral structural materials and of such optional features as lean-to's, canopies, monitors, ventilators, monorails and louvers. *Luria Engineering Co.*

For free copy circle No. 12 on postcard, p. 77

Cut-off work

A new, pocket-size handbook on the subject of cut-off work is offered. Called "Power Sawing Handbook," this 108-page text concentrates solely on cut-off techniques. The book contains a handy summary of existing cut-off methods and provides information on such subjects as "How to Estimate Cut-Off Costs." One chapter deals with the significance of high-speed steel in its new form as a flexible saw band. High-speed steel is defined and its previous metallurgical limitations as applied to sawing, are outlined. *The DoAll Co.*

For free copy circle No. 13 on postcard, p. 77

Fasteners

A new 2-color, 52-page stainless fastener data book has been published. The first part of the book includes illustration, thread and size specifications, and availability in a variety of corrosion resistant metals of 40 basic fastening devices (screws, bolts, nuts, washers, rivets, etc.). The second part consists of engineering data relating to the composition, properties, applications, and weights of stainless steels, as well as other tables. *Allmetal Screw Products Co., Inc.*

For free copy circle No. 14 on postcard, p. 77

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 74

Carbides

A four-page booklet describes a complete line of tungsten carbide grades. Divided into four sections, this booklet covers straight carbide grades for machining cast iron, non-ferrous and non-metallic materials; steel cutting carbide grades; carbide for die applications and special purpose grades, including some of the newer carbide grades used in mining and rock-drilling applications. Included in the folder are physical and chemical data on each of the grades, together with chemical analyses of some types of the materials. Featured also are tables to guide the user in selection of carbide grades. *Adamas Carbide Corp.*

For free copy circle No. 15 on postcard

Balancing machines

Universal dynamic balancing machines utilizing a piezo-electric measuring and computing system, together with their operation, are described in an illustrated bulletin. The piezo-electric measuring and computing circuit directly indicates unbalance amount and location for two planes with reference to the engaged work piece. Specifications for 25 sizes of machines are given. *Testing Equipment Co., Inc.*

For free copy circle No. 16 on postcard

Conveyor wheels

Company line of plain, flanged and geared conveyor wheels, hoist trolleys, I-beam trolleys and roller bearing wheels are described in a 12-page brochure. Dimensions and specifications are included. *Grey Hub Co.*

For free copy circle No. 17 on postcard

Process controller

Three models of a controller designed to establish whether a process has shifted from optimum tolerance area are described in a 4-page brochure. One model is used on the company's grinders equipped with plug sizing, a second on machine tools incorporating automatic adjustment features to compensate for tool wear and a third can be applied where machine capability varies greatly or is not known. *Bryant Chucking Grinder Co.*

For free copy circle No. 18 on postcard

Dial indicators, gages

An extensve line of dial indicators and dial indicating gages is described and illustrated in two new catalogs. A 24-page brochure containing text, pictures and specifications is devoted to dial indicators and accessories. The gage catalog, 48 pages, describes units for checking all types of dimensional conditions such as ID and OD, depth, height, thickness, location and pitch diameters. *Federal Products Corp.*

For free copy circle No. 19 on postcard

Screw machine

A new bulletin on a 1⅜ and 1⅝ in. single spindle automatic screw machine is available. There are discussions and photographs of the unit's variable spindle speed range and turret feeds, which are dial controlled as well as on the spindle head, cross slides, cut off and turret. Additional material is included on universal camming, quick change collets, stock feed, controls and spindle bearing mounting. *Cleveland Automatic Machine Co.*

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Refractory concrete

An illustrated folder describes typical applications for a cement which can be combined with refractory aggregate to produce refractory concrete reported capable of withstanding temperatures up to 2400°F. Some of the uses shown are in blast furnace foundations, foundry floors and gangways, pig-iron runners, lining on reheat furnace doors, annealing oven doors and work buggies, stove roofs, soaking pit foundations, the lining for pipes, flues, mains, and for machine foundations. *LaFarge Aluminous Cement Co.*

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Tool steels

High speed steels of principal U. S. manufacturers are listed in a revised 32-page vest-pocket size booklet. Types are designated by SAE symbols with, according to the company, listing of comparable competitive brands. Quenching range and principal applications are given for each of the major types of high speed steels. *Le Vita Metal Alloy Co.*

For free copy circle No. 22 on postcard

Brinell testing

Equipment catalog describes and pictures a company line of Brinell hardness testing machines. Dead weight, hydraulic, hand operated, motor operated, laboratory and production models are featured. Also covered are instruments for ductility, tensile, compression and traverse work. Air testers and direct reading proving instruments are included. *Steel City Testing Machines, Inc.*

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Controllers

A bulletin describing a line of indicating controllers discusses the measuring system employed and the electronic unit used to transmit process requirements from indicator to controlling unit. Models of control available with their suggested applications are included, as well as specifications giving scale ranges, dimensions and weights of the units. *Barber-Colman Co.*

For free copy circle No. 24 on postcard

High vacuum furnaces

A new 8-page catalog (No. 552) describes and illustrates vacuum furnaces for melting, heat treating, sintering, annealing, brazing, degassing, and purification of metals and alloys. Features of the processes are explained, pointing out the fact that such properties as ductility, cold working characteristics, machinability, fatigue resistance, resilience, temperature resistance, performance life, abrasion resistance, and corrosion resistance may be increased through vacuum melting and vacuum treating. *High Vacuum Equipment Corp.*

For free copy circle No. 25 on postcard

Insulation

An all-silicone-rubber insulating system for motor and generator stator windings is discussed in a new 4-page leaflet. It explains why this insulation has superior electrical, thermal and mechanical properties as well as desirable chemical properties. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 26 on postcard

Spray masking

A new 4-page brochure on spray paint masks and masking specialties lists and illustrates overlapping disk sizes and custom shapes made from many types of pressure-sensitized tape. Included is material on masking especially designed for release from anodized aluminum and magnesium surfaces, and for sealing electronic terminals, as well as tape for use on printed circuit master drawings. *By-Buk Co.*

For free copy circle No. 27 on postcard

Carbide guide

A handy pocket-sized guide designed to help the carbide user select the proper grade for his requirements has been published. The pocket guide features tables for selection of steel cutting grades and for selection of grades for cutting cast iron and nonferrous materials. Also included is a decimal equivalents table and a diagram for showing the relation of feed to speed. *Adamas Carbide Corp.*

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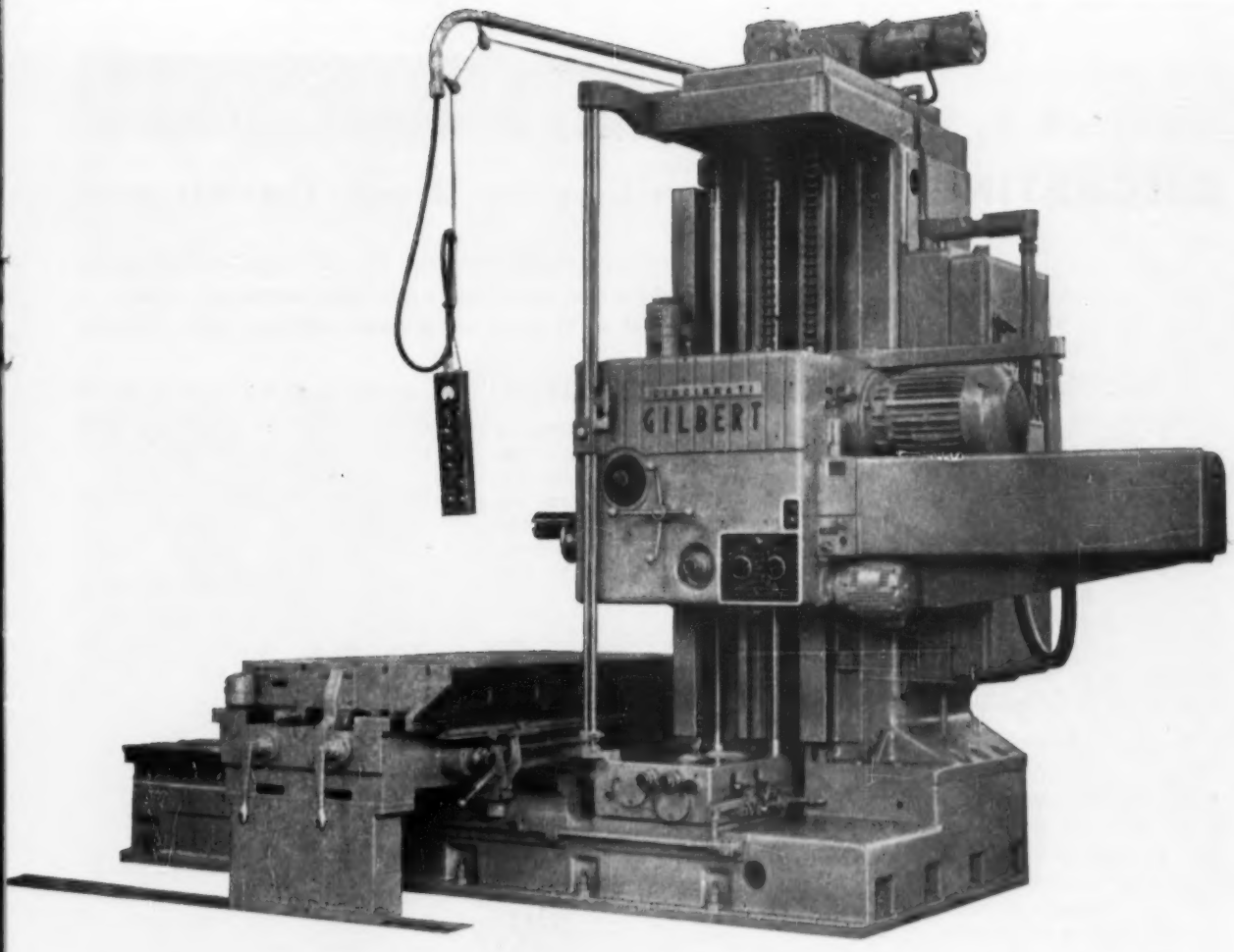

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Preset dial for
power automatic changing of speeds and feeds •
Pushbutton station,
always near operator, with:
Start, stop, reverse for spindle •
Control for spindle electric clutch and brake •
Reverse for all feeds •
Forward, reverse power rapid traverse •
Selection and control for spindle and
milling feeds and rapid traverse •
Separate control for
back gear clutch on spindle sleeve •
Selection of milling feeds to
head, table, and saddle •
Control of spindle feed electric clutch •
Power clamp to head; and
Automatic positioning if ordered •

softens operators, treasurers! A word of caution before you read about this all-new 4-5" horizontal boring mill: it will probably spoil your operators and your company treasurer as well.

Every feature, new from the floor up, is designed to make the operator's job simple, fast, and accurate. He'll look as if he's loafing, but his floor-to-floor time will be faster than it's ever been before.

It's your company treasurer who'll require careful tactics. At first, he'll think you're a shrewd man with a dollar when you show Gilbert's proposal. But then he'll think *all* budget items should offer this many new features per dollar—and few will.

Ask for Bulletin 855 (Table Type) and Bulletin 955 (Floor Type).

The Cincinnati Gilbert Machine Tool Co.
3366 Beekman St., Cincinnati 23, Ohio

You can purchase one of these machines right now, by using our new low-cost financing plan: 6% simple interest (3% add on), up to 5 years to pay.

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DIECASTING: Aluminum Engine Block Developed

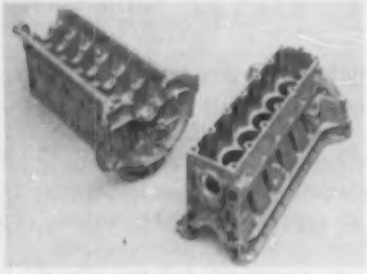
Many advantages reported for this experimental model including a need for less machining and weight saving of 132 lb . . . All block's 129 holes were cored and cast—none drilled.

Successful development of an aluminum die cast engine block which saves in weight has been announced by the Doehler-Jarvis Division of National Lead Co.

The straight type engine block weighs approximately 50 lb as it comes from the die casting machine and 43 lb when trimmed. By using aluminum and by reducing the wall thickness in the aluminum engine block, weight savings of 132 lb are realized.

Experimental Model

The new block has been produced on an experimental basis at a Toledo plant of Doehler-Jarvis on a die casting machine handling dies weighing up to 50 ton. These two developments resulted from a joint project of National Lead Co. and the Kaiser Aluminum and Chemical Corp.



No holes had to be drilled in die cast aluminum engine block.

The die cast block needs far less machining because the machining is confined to the main sealing areas. The heat conductivity of aluminum is higher and an engine block in aluminum would therefore require a less complicated cooling system

No Holes Drilled

The new engine block can be produced at a rate of 30 to 35 pieces per hour on a single machine, according to Doehler-Jarvis. All the 129 holes are cored and cast to size—not a single hole has to be drilled in the block. The die cast blocks will undergo intensive testing and are expected to stand up under stresses and requirements.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 77. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Methods:

Unit helps scrap burner meet city smoke law

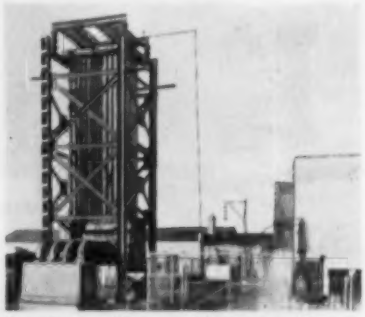
A smoke precipitator, developed by Summer & Co. of Columbus, Ohio, has kept that firm in the non-ferrous scrap metal business when city smoke ordinances threatened to curtail their scrap metal burning operations. Summer have had their non-ferrous metal operations jeopardized by city and county regulations against open burning.

As a result they developed an electrical smoke precipitator which eliminates the clouds of black smoke, ash and odor that result from open fire recovery operations. The precipitator has been approved by the Columbus Smoke Inspector, and the firm has been granted a burning permit as the result.

Although the machine's fire box allows open fire burning, 100 pct of the smoke and 99 pct of the resulting odor has been eliminated. Before installation of the precipitator, Summer had numerous complaints filed against them by irate residents living in the plant's vicinity. The machine is so successful that residents now report they cannot tell when the firm is conducting burning operations.

Useful For Smelters

Unlike other smoke control methods, the precipitator is also useful for smelters who wish to recover the residue left from the



Smoke unit permits scrap burning without smoke and odor.

burning operation. This residue is easily recovered and only one man is needed to tend the fire, cutting down on manpower overhead.

The machine requires no manual cleaning at the end of a day's heavy burning schedule. When the smoke collection pipes are sufficiently dirty, washing sprays are turned on and the collected material is washed down the drain.

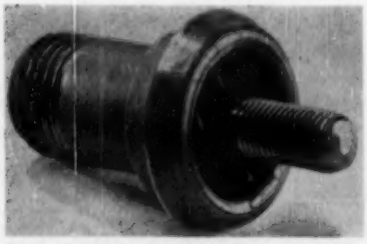
Forming:

Investment process reduces machining, reject rate

The use of investment casting has enabled a manufacturer to get radiant gas burner thimbles that require less machining and have a low reject rate, according to a report of the Technical Service Committee of the Investment

Casting Institute, Chicago, Ill.

The manufacturer was having trouble producing the shapes and contours that were needed on sand cast burner thimbles used to deflect a gas-air mixture onto a ceramic combustion bowl. To withstand ambient temperatures up to 2300°F, a 35 pct nickel, 15 pct chromium alloy is used.



Investment casting for smoothness, concentricity of thimble.

The manufacturer turned to the investment casting process. Despite the fact that such castings each cost a few cents more as received from the foundry, he discovered that final costs are 35 pct lower.

Almost no machining is required on parts produced by investment casting, their surfaces are smooth and concentric enough as cast and the foundry has developed ingenious patterns to permit casting inside surfaces that are just as smooth and accurate as the outside. The reject rate is now almost zero.

Joining:

Semiautomatic weld speed upped with alloy wires.

A new welding process said to require no flux and offering the versatility of manual welding with the control of the full automatic has been announced by Stoody Co., Whittier, Calif. Depositing 7 to 15 lb of hard metal an hour, this material and method combination is reported to make possible a welding speed two or three times that of the manual process. It involves a line of tubular fabricated alloy wires designed for open arc application through standard semiautomatic welders.

Three materials are now in production at the Stoody Company plant in Whittier, Calif.—a 50 pct high chromium hard-facing alloy, a 20 pct alloy for hard-facing and a Hadfield nickel manganese for build-up of manganese steel parts. The 7/64 in. wires now available are identical in composition to the company's tubular electrodes and wires.

Continuous Feed

In operation, semi-automatic welding using this system is much like manual welding but wire feed is continuous and both feed and arc control are automatic. Application by open arc

Semiautomatic welding process is speeded with alloy wires.

gives complete visibility at all times. Deposits bond well to the base metal with very little penetration or dilution and either stringer beads or wide wash passes can be used, depending upon the part and type of deposit desired. Current required for the semi-automatic wires does not exceed 350 amp and a power source of not less than 400 amp is recommended.

Almost any standard semi-automatic welder, with minor adaptations, can be used for the process, the maker states. A welding nozzle, special grooved feed rolls and supplementary wire guides are all that are required to make the conversion in most cases.

Non-Ferrous:

Wide aluminum extrusions attract designers

Design versatility and functional adaptability are leading to a growing acceptance of wide extrusions made of aluminum, according to a report from the development department of Harvey Aluminum Co.

Recommending wide extrusions in redesigning numerous existing structures and structual sections, they report that wide profile extrusions can be considered as sheet or plate incorporating integral stiffeners and structural members produced all in one piece at one time. Thus, with wide extrusions, design engineers can obtain shapes to the desired finished section by combining components into one integral unit. Built-up sections are eliminated and assembly and production time reduced. Material distribution is such that considerable weight is saved together with an increase in strength.

Other Advantages Given

Some of the other advantages observed by the Torrance, California company are high strength, (extrusions offer increased mechanical properties); rigidity (numerous small sections combined into one large structure increase rigidity); sealing (one-piece wide extrusions eliminate sealing for pressure and liquid tightness within the splice area.)

Rolling:

New techniques improve embossing equipment.

New techniques in producing precisely matched steel embossing rolls and an increase in speeds of embossing machines is reported by the Baldwin-Lima-Hamilton Corp. to be expanding the use of these materials.

Three-dimensional patterns, textures, figures, and motifs of unlimited variety, they state, are being impressed in sheet metals, leather, plastics, paper, glass, tex-

tiles, and other materials to decorate them and to change their texture, stiffness, rigidity, or strength.

Making better embossing rolls depends upon the availability of forged steel rolls having sound, uniform metal, particularly at the surface, which responds uniformly to the production of an impressed pattern under a rolling die, and case hardens uniformly when subjected to precision methods of flame hardening.

Pattern for embossing rolls was impressed by rolling die.

Through engraving methods, Modern Engraving & Machine Co., Hillside, N. J., produces perfect mates in forged steel rolls. Forged and machined rolls ready for engraving are supplied by Standard Steel Works Div. of Baldwin-Lima-Hamilton Corp. in sizes ranging up to 20 in. diam and 6 ft long. Rolls up to 12 ft in length are supplied in smaller diameters. Production of perfect mates means that the most complicated design is matched, cleared, and crowned to emboss on one or both sides.

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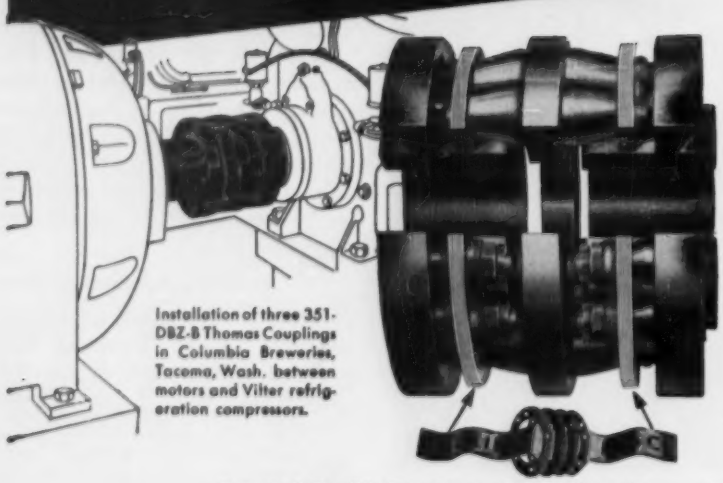
for more years of better service!



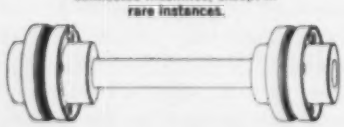
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN. PENNSYLVANIA, U.S.A.

Instruments:

Piezoelectric ceramics used for transducers.

Several lead-oxide based piezoelectric ceramics that have excellent electromechanical properties and are stable over a wide temperature range are expected to find considerable application as transducers for sensing elements in accelerometers, sound detectors, sonar, velocimeters, strain and pressure gages, and as drivers in ultrasonic devices according to the National Bureau of Standards. These materials, they report, can be expected to replace barium titanate in many commercial applications and extend the use of ceramic transducers. The compositions were developed by the Bureau's mineral products laboratories under sponsorship of the Army's Office of Ordnance Research.

Temperature Range Widened

Piezoelectric ceramics are widely used as transducers for energy conversion between electrical signals and mechanical motion. Barium titanate has been used for many transducer applications, but these applications have been seriously limited because of its narrow temperature range—from 20° to 100°C. To overcome this limitation, and to improve the properties of ceramic transducers, the Bureau developed lead-oxide based ceramics of particular compositional ranges having a response that is uniform over a much wider temperature interval.

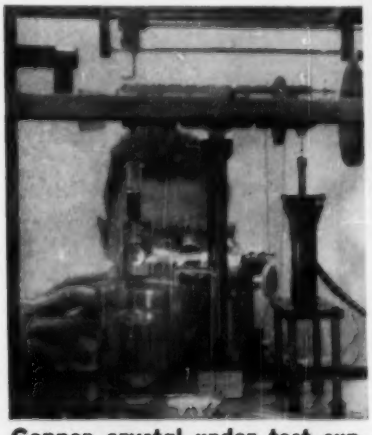
The lead-oxide based compositions have better electromechanical properties than the previously

developed barium titanate ceramics because the proportions of their ingredients place them close to the boundary where morphotropic transformation—an abrupt change in the solid-solution phase—takes place. The Bureau has discovered that when the solid-solution phases of certain lead-oxide compositions are ferroelectric on both sides of the morphotropic boundary, the material yields ceramic transducers that have more desirable properties over a wider range of temperature than other compositions of similar crystalline structure.

Testing:

Metal whiskers indicate crystal strength

A new technique for testing the crystal strength of a metal involves placing a metal whisker in a vertical position and embedding the upper end in a glass-like substance which has been heated to the melting point. The crystals themselves have been developed by General Electric scientists by a process which uses a high concentration of metal in the form of gas. The gas is obtained either by chemical means or by boiling the metal.



Copper crystal under test supports glass cylinder in beaker.

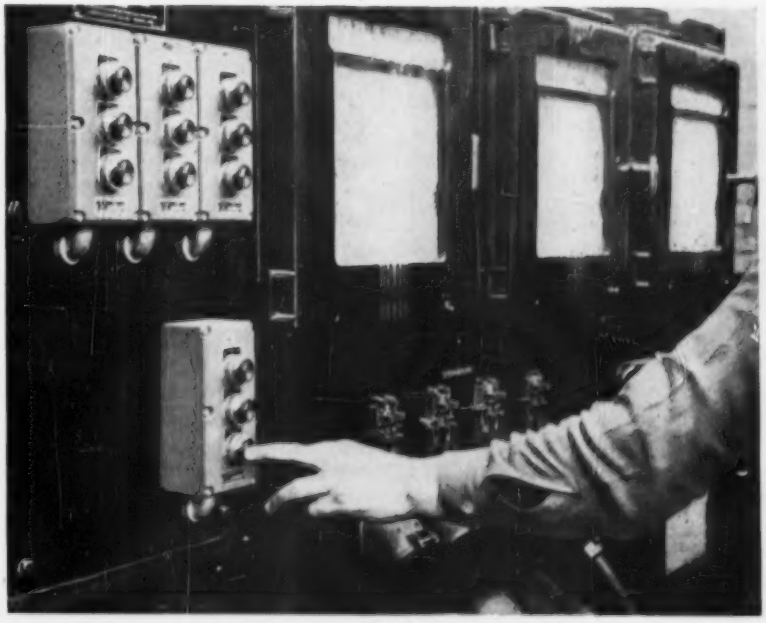
Pull Tests Strength

In the testing of the crystals, the bottom of the metal whisker is attached to a glass cylinder floating in a container of oil. With both ends affixed, the test is conducted by siphoning oil out of the container, thus reducing the bouyant force supporting the glass float and causing its weight to apply a downward pull on the whisker. In cases where large loads are applied, a magnet is enclosed in the glass float and the float is pulled downward when current is applied to a solenoid which surrounds it. The resulting elongation and eventual breaking of the whisker are projected on a screen for viewing.

Bending Used Before

The method previously used for testing whisker strength involved measuring the amount a whisker bent under a load applied from one side. With this method the greatest stress was concentrated at one point, rather than being evenly distributed throughout the test sample.

CAN YOU AFFORD THERMOCOUPLE FAILURE?



PEERLESS RESTORER®

GIVES YOU PUSH BUTTON REPAIR OF FAULTY THERMOCOUPLE CIRCUITS

Loss of a heat, reheat-treats and costly maintenance often result from errors caused by faulty thermocouple circuits. Even the most modern electronic instruments depend on good circuits to register actual furnace temperatures. The Peerless Restorer operates with your presently installed instruments to detect and correct thermocouple circuit failure instantly DURING ANY HEAT.

SEND FOR CATALOG R-22

Peerless Electric

STOP — Ruined Heats, Reheat-treats, Costly Maintenance

THE PEERLESS ELECTRIC COMPANY · WARREN, OHIO

FANS · BLOWERS · MOTORS · ELECTRONIC EQUIPMENT

NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 77 or 78

Grinders include swing capacity to handle flanges

Two models in a line of plain hydraulic grinding machines are provided with extra swing capacity to accommodate a flange or projecting arm on the workpiece. All of the grinding machines—designated 6 in. R; 10 in. L; 10 in. R; and 14 in. L—incorporate fllmatic bearings which automatically adjust themselves to variations in forces created by the grinding action. They also feature a lever control for balancing the grinding wheel within 20 seconds without removing wheel mount. *Cincinnati Grinders, Inc.*

For more data circle No. 29 on postcard, p. 77

Large unit grinds parts 12,000 lb in weight

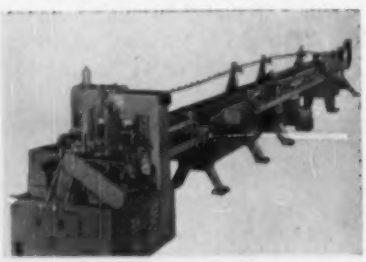
A surface grinding unit has a 96 in. swing grinding capacity, takes up to 36 in. in height, can grind parts 12,000 lb in weight, and is capable of holding very close tolerances. Powered by a 100 hp motor, it precision grinds both ferrous and nonferrous metal. In addition, it can be adapted to grind practically any kind of plates, regular or irregular castings, and a multitude of similar large size parts—ground one at a time or in various combinations. *CTR Sales and Grinding Co.*

For more data circle No. 30 on postcard, p. 77

Can bodymaker designed for fast production

An automatic, high-speed can making machine is designed to produce 400 to 450 cans per min. Compact in structure, it has a work table equipped with knurling, notching, edging and pre-fluxing attachments, without an idle station. The unit handles cans ranging from 2⅜ in. to 5⅛ in. in height and from 2 1/16 in. to 4¼ in. in diam. Adjustments in changing can sizes are easily and quickly made. The bodymaker is furnished complete with automatic controls. *E. W. Bliss Co.*

For more data circle No. 31 on postcard, p. 77



Scrap baler produces briquette every 3 minutes

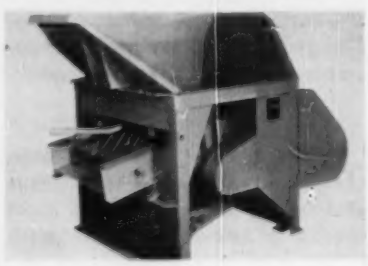
A new, lightweight, scrap metal baler adaptable where baling of light gauge ferrous and nonferrous metals is desired will produce a briquette every 3 minutes, with an 8 hr shift capacity of as high as 140 briquettes, depending on density of the metal. Designed for one man operation. Compresses scrap into 12x12x12 in. briquettes. *East Chicago Machine Tool Co.*

For more data circle No. 32 on postcard, p. 77

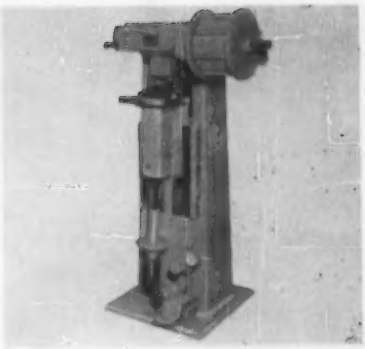
Screener requires no pits or foundations

A self-contained screening and separating unit is designed for floor use and is equipped with an adjustable lump breaker. The unit, rated at 50 ton per hr capacity, is equipped with a 30 in. x 60 in. screen; has a 30 cu ft hopper; and a radial type magnetic pulley for tramp iron removal. The screen is also equipped with a special protective seal between belt and screen to keep sand from moving parts. In addition, the unit is designed to provide no obstruction at floor level. *National Engineering Co.*

For more data circle No. 33 on postcard, p. 77



New marker cuts stresses on parts marked



A new marking machine features a pneumatic die-carriage and has a pneumatic table lift which produces up to 4 ton marking pressure. In addition, it provides an air cushion which reduces the stress on the parts being marked as well as on the marking die. The unit employs either roller dies for marking flat parts or flat-roll dies for marking round parts and is also available with flat-roll holders or mortised roller dies and quick-change steel type. It is recommended for marking parts such as lathe tools, gears, reamers, drills, cutlery, instruments and other parts with names, numbers, codings, trademarks, special lettering and designs. Capable of marking several lines on parts up to 6 in. in thickness, the unit can handle 800 parts per hr. *Jas. H. Matthews & Co.*

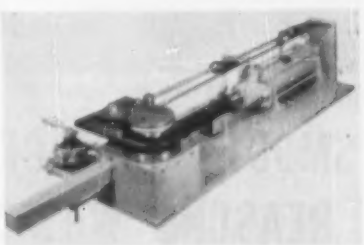
For more data circle No. 34 on postcard, p. 77

Fork lift truck eliminates gear shifting

No gear-shifting and dependable performance under all types of operating conditions are reported for a line of fork lift trucks incorporating a new automatic transmission. The drive mechanism is designed to automatically supply the correct torque to the lift's drive wheels as required. In addition, a special creep control feature enables the operator to guide the truck in the exact position wanted and maintain high engine speed for full hydraulic power in lift, tilt or hydraulic operation. An accessory unloader eliminates manual handling. *Towmotor Corp.*

For more data circle No. 35 on postcard, p. 77

Automatic bender simplifies changeover tooling



A compact, bending machine designed for heavy-duty, high production output has simplified tooling for easier changeover. Only a single link is needed to make any bend from minimum to maximum radius. Serrated slide block is mounted on swing plate and attached to the link. While tube diameter remains constant, jaw on block moves forward or backward to fit any centerline radius. When radius changes, only die requires change. *Paul Machine Tool & Die Works.*

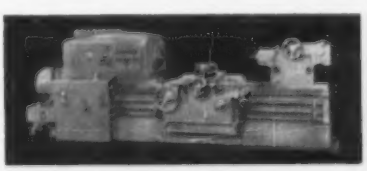
For more data circle No. 36 on postcard, p. 77

Steel covers protect freight in gondolas

For simplified freight handling and better protection of cargo, corrugated steel covers have been developed for gondola cars. Each freight car requires two of the covers which are 22 ft long; 5 ft, 10 in. high; and 6 ft ¼ in. wide. Easily and swiftly removed with an overhead crane, the covers fit on special floating skids which project 15 in. above the car floor and they move along guides at the impact of longitudinal shock. Shock is absorbed at either end of the car by heavy duty coil springs. *Republic Steel Corp.*

For more data circle No. 37 on postcard, p. 77

Engine lathes calculate spindle speed automatically



Heavy-duty engine lathes for accurate, high production turning, boring and facing of large size workpieces offer: automatic calculation of spindle speed to produce the desired surface cutting speed with a range of 36 speeds in one model and 10 in another. *Monarch Machine Tool Co.*

For more data circle No. 38 on postcard, p. 77

Piping, mounting eased with new 4-way valve

Design of a new 4-way, foot-operated air valve is said to make connecting and mounting easier. Built for shop air ranges up to 250 psi, the unit incorporates a pressure-balanced, self-aligning valve seat in constant contact with a rotor containing flow passages. Actuation of the valve shears flow and its "shear-seal" face wipes the rotor clean. *Barksdale Valves.*

For more data circle No. 39 on postcard, p. 77

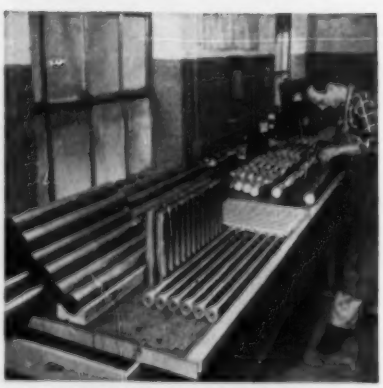
SUPERIOR TUBING acts as a temperature and mechanical handling shield for delicate sub-surface, radioactive logging instruments.

SMOOTH SURFACES, CLOSE TOLERANCES, LIGHT WEIGHT: REASONS WHY SUPERIOR TUBING IS USED TO HOUSE THESE DELICATE WELL SURVEYING INSTRUMENTS

Well Surveys of Tulsa, Okla., purchases Superior Seamless Type 304 Stainless Tubing in large OD, light wall sizes and in 63 in. lengths. Into these tubes, which in the finished state vary from 28 to 31 in., radioactive well-logging instruments are inserted—instruments so delicate that stray electrical waves or gases leaking into the casing may throw them off.

For that reason, the tubing is supplied in the "as drawn" condition, with a smooth surface that has a high radiation factor. Stainless is specified because plated material used in the past flaked off and short-circuited the instruments. The thin wall size (2.098" x .018" wall) is important; first, because of weight and, second, because of the close fit demanded. After the instruments are inserted, the tubing—closed by spinning—goes into an outer housing which must withstand pressures of 20,000 psi.

Whatever you want tubing for—an instrument housing, hypodermic needle, radio antenna, or heat exchanger—you'll find that the high quality of Superior tubing saves you time, money and production headaches. Send for your free copy of Bulletin 40—*A Guide to the Selection and Application of Superior Tubing*. SUPERIOR TUBE COMPANY, 2004 Germantown Ave., Norristown, Pa. *On the West Coast:* Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.



PRE-TESTING an assembly before it is inserted into the Superior tube.

Superior Tube

The big name in small tubing

All analyses .010" to ⅝" OD
Certain analyses in light walls up to 2¼" OD

The Iron Age SUMMARY . . .

Year-end pressure for production continues despite automotive letdown . . . Mills will lose production during holidays . . . Free World output high in '55.

No Letup . . . Steel demand still pushes the industry's ability to produce despite the slight chink in the automotive production race. Only apparent effect of the Detroit letdown appears to be a tendency to withdraw from costly conversion steel arrangements. Warehouse demand may also be affected. But the car companies are still applying pressure on the mills for deliveries.

Holiday Lag . . . The holiday season has brought a letdown in steel production and shipments. But the industry is holding the loss to a minimum in view of the strong market and prospects for full order books through first six months of the new year.

Besides, maintenance and cold weather are likely to take their toll of production in the months ahead. Producers are worried over the continuing wear and tear on furnaces and other equipment, which have had only emergency maintenance work since the boom got into full swing.

The outlook for major consuming industries, including automotive, is such that loss of even a small tonnage is important. Inventory-building will continue to be a strong factor through the first half of 1956.

Comeback Strong . . . Free World steel production made a strong comeback in 1955, regaining its 3-to-1 edge over Russia and the Red bloc of nations behind the Iron and Bamboo curtains.

A survey by THE IRON AGE shows that the free nations of Europe, Asia, and the United States boosted their steel output in '55 by 22.5 pct over 1954 production. Meanwhile, Russia and its satellites increased production by only 10.5 pct.

The U. S. led the free nation comeback with an increase of 32 pct under the impetus of the biggest economic boom in its history.

The Free World poured 223 million tons of ingots in '55, compared with 182 million tons the previous year. Red nations produced 68 million tons in '55, as against approximately 62 million tons last year.

Small Increase . . . Russia produced 49.6 million tons this year, compared with 45.2 million tons in '54, an increase of only 10 pct.

Total world output in '55 is estimated at 293 million tons, as against 245 million tons in '54, an increase of 48 million tons. Of this increase, the U. S. accounted for approximately 28.2 million tons, or 59 pct. U. S. production this year is estimated at 116.5 million tons, a new record, compared with 88.3 million tons last year.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,207	2,388	2,400	1,870
Ingot Index (1947-1949=100)	147.0	148.5	149.2	116.2
Operating Rates				
Chicago	97.0	99.0	99.0	81.0
Pittsburgh	96.0	102.0	99.0	74.0
Philadelphia	100.0	105.0	105.0	65.0
Valley	92.0	95.0	98.0	68.0
West	98.0	99.0*	100.0	78.5
Detroit	90.0	92.0	97.0	91.0
Buffalo	105.0	105.0	105.0	100.0
Cleveland	92.0	97.0	99.0	84.0
Birmingham	90.0	94.0	94.0	62.5
S. Ohio River	90.0	90.0*	94.0	86.0
Wheeling	95.0	101.0	105.0	85.0
St. Louis	98.0	105.0	101.0	78.0
Northeast	80.0	85.0	89.0	46.0
Aggregate	91.5	99.0	99.5	77.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$53.00	$52.17	$47.00	$32.83
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	22.20
Copper, electrolytic	43.00	43.00	43.00	30.00
Lead, St. Louis	15.30	15.30	15.30	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	109.375	109.50	99.125	87.125
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

Special Carbon Bars Change

U. S. Steel announces new base for both special quality and merchant hot-rolled carbon steel bars . . . Little easing in demand expected for currently tight products.

◆ U. S. STEEL and its general operating divisions have established two product classifications for special and merchant hot-rolled carbon steel bars.

The base price for merchant quality remains unchanged. The new base price for special quality carbon bars is 35¢ per cwt higher than merchant quality. This includes the minimum charge for quality which had previously been assessed as an extra. Various extras have been revised in both product classifications, principally for size and chemistry. Related changes in extras are also being made for concrete reinforcing bars, carbon rerolling and forging blooms, billets and slabs. Certain extra charges are being made for alloy steel products.

Despite some reported cutbacks in automotive production, there is little noticeable letup in heavy demand for sheet and strip. What isn't going directly to assembly line operations is being set aside in inventory.

Current inventory - building should give the industry a feeling of security in the event production is pushed up later on.

It looks as though the railroads will be getting enough steel in first quarter '56 to build about 5500 cars a month. This 20 pct increase in their steel allotments can be viewed as something of a "plus" in view of the roads' late entrance into the buyers' free-for-all.

With both these big consumers still very much active in the marketplace, it behooves other customers to keep up the pressure on suppliers.

Specifically, it means that already-strong mill carryovers on sheet, strip, plate, and bars will probably get even worse in the immediate weeks ahead. And, customers who have already been given a first quarter allotment in plate and other products which go into freight cars, can expect a reduction in their allotment the first half of next year.

SHEETS AND STRIP . . . Although mill terminology may differ, the "quota," "allotment," or "adjusted allocation" systems all mean that hard-pressed consumers for the past six months haven't been getting enough steel to meet production demands. The pinch has been especially noticeable with respect to all grades of sheet and strip in virtually every market area. Indications are that the situation will continue in similar vein for the next six months. Meanwhile, in **Chicago**, some brokers who want sheets for delivery in first quarter '56 are bringing in European steel. And conversion of hot-rolled sheet continues at a good clip, along with light plate. These deals can be expected to show little sign of letup until at least the first quarter ends. Customers who aren't on some kind of allocation system in the midwest area, stand very little chance of getting any sheet before the end of next June. Even some looked-for letup in automotive demands for sheet and strip has so far failed to materialize. Late word from **Cleveland** is that mills in that area are still receiving regular calls to meet automakers' needs. In **Pittsburgh** and the **East**, back-to-the-wall sheet consumers are revising their first quarter production schedules in the hope that second quarter will see greater tonnages from the mills. Some major **West Coast** consumers are likewise becoming increasingly concerned about delivery schedules in the early weeks of next year. Some are already realigning their production schedules to meet any contingency.

BARS . . . Along with sheet and strip, the bar delivery situation in most areas has been touch-and-go for months. By establishing rigid allotments on hot-rolled bars, some producers are beginning to feel they should be current in this department by March. In some areas, the midwest, for example, producers are reminding customers that stepped up demands from the railroads could tie up future rolling schedules again. Right now in **Chicago**, for instance, the earlier 30-to-60-day hot-rolled bar delivery backlogs are being cut out going into first quarter '56. It's felt, however, that many cold-finishers will see a dip in their incoming hot-rolled bar allotments during **January**. This will probably push out cold-finished bar backlogs beyond next **March** and April. And, so far, bar purchases by the automakers have continued at an uninterrupted pace.

PLATE . . . Some conversion deals in the product are reported more frequently in both midwest and eastern areas. All told, virtually all sizes of plate are in tight supply in every major district and little hope of easing in the situation is seen for at least the next six months. In some areas, **Detroit**, for instance, signs of some gray market activity are showing up. Some brokers are offering light plate at higher prices than prevailing levels. In a hard-put-to attempt to stay somewhat current on plate deliveries, a large eastern producer is talking on a month-to-month order basis only. With greater amounts of plate destined for the railroads for at least the next three months, most other plate consumers can expect slight relief in meeting the full extent of their own needs.

STRUCTURALS . . . In much the same order and delivery pattern as plate, both wide-flange beams and standards have been and will continue to be in tight supply well into next year. The shortage is serious enough in most major areas to temporarily tie up construction projects, delay the start of new projects by several months. In some areas, both **East** and **West**, major producers expect little letup in customer demand for at least the next 12 months.

Purchasing Agent's Checklist

SCRAP: Inside Story on Exports . . . . . p. 25
EXPANSION: U. S. Steel makes big plans . . . . . p. 26
ALUMINUM: Casting Costs Drop . . . . . p. 61
COPPER: Crisis in Chile . . . . . p. 94

Comparison of Prices

(Effective Dec. 27, 1955)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Dec. 28 1955	Dec. 21 1955	Nov. 29 1955	Dec. 28 1954
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.797¢

	Dec. 28 1955	Dec. 21 1955	Nov. 29 1955	Dec. 28 1954
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern, Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig Iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$53.50	$53.50	$48.00	$33.50
No. 1 steel, Phila. area	54.50	51.50	48.50	31.50
No. 1 steel, Chicago	51.00	51.50	44.50	33.50
No. 1 bundles, Detroit	45.50	45.50	42.00	27.50
Low phos., Youngstown	55.00	55.00	49.50	35.50
No. 1 mach'y cast, Pittsburgh	55.50	54.50	52.50	42.50
No. 1 mach'y cast, Philadel'a	56.50	56.50	53.50	42.00
No. 1 mach'y cast, Chicago	56.50	56.50	54.50	44.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$53.00	$52.17	$47.00	$32.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.38
Foundry coke, prompt	16.25	16.25	16.25	16.76
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	43.00	43.00	43.00	30.00
Copper, Lake, Conn.	43.00	43.00	43.00	30.00
Tin, Straits, New York	*109.375*†	110.00	99.125	87.125
Zinc, East St. Louis	13.00	13.00	13.00	11.50
Lead, St. Louis	15.30	15.30	15.30	14.80
Aluminum, virgin ingot	24.40	24.40	24.40	22.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. • Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 99→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00•	.....	.....	.....
Birmingham *W9*	54.50	55.00•	59.00	.....	.....
Birmingham *U4*	54.50	55.00•	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	.....	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	.....	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. •Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo, *H1*, $68.75; Jackson, *J1*, *G1*, $67.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	348	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	36.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	50.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J3*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D3*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A1*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

Scrap Prices Jump and Slide

Steelmaking grades advance $3 in the East . . . Chicago reports slight weakening . . . Little change elsewhere . . . Eastern surge sends composite up 83¢ to $53.00.

◆ PRICES moved wildly as a strong market was rocked by heavy demands on the one hand and price resistance on the other.

In Chicago, best steelmaking grades slipped a notch when a consumer finally managed to buy scrap at reduced figures. This meant brokers were covering orders at a loss and indicated the pressure that is being brought for lower prices.

In the East, No. 1 heavy melting jumped $3 to $55. The boost was a measure of the need of the area's largest consumer for scrap. In this district, the mills appear primarily interested in getting tonnage quantities and seem willing to pay high figures to keep scrap flowing.

Elsewhere, there was little activity. Pittsburgh reports most prices holding. In Buffalo top steelmaking grades advanced and the weather had shut off the flow of outside scrap. Steelmaking grades moved up $2 in Boston.

THE IRON AGE Composite for No. 1 heavy melting steel scrap moved up 83¢ to $53.

Pittsburgh . . . The market continued strong this week as sales of nearly all grades confirmed earlier prices. Openhearth scrap prices were still somewhat confused, particularly secondary grades. However, some tonnages of No. 1 heavy melting have been sold at $54. A substantial tonnage of low phos was purchased by a local consumer at $59. Sales of RR specialties and short rails also confirmed prices at $60 and $68 respectively. No. 1 machinery cast advanced another dollar on the basis of the latest sale, and heavy turnings advanced $2 a ton to $47. Blast furnace grades are unchanged.

Chicago . . . The battle to hold Chicago scrap at lower prices finally scored a breakthrough last week. An attempt by local buyers to move in at older price levels scored, as an area mill purchased top grade scrap at the bottom of the price spread, and received delivery from a number of sources. The price slip found brokers accepting orders for $42 delivered No. 2 heavy melting and covering it with material that had been purchased at $42.50 and even higher, and covering a $54 railroad purchase with material that costs up to $56.

Philadelphia . . . On the basis of a purchase by a leading consumer, price of steelmaking grades rose $1 to $3 this week. No. 1 heavy melting jumped to $55 per ton. The increases reflected strong domestic demand and a continuing heavy export market. Other grades held steady, momentarily at least.

New York . . . Continued strong demand from domestic consumers plus heavy pressure from exporters for deliveries has raised steelmaking scrap prices $2 in this district. The raise this week was not confined to any group of items, but spread across the board to include turnings and cast grades.

Detroit . . . The market in Detroit hit a holiday lull this week but the overall tone is still very strong. Smaller tonnages of scrap on next month's auto lists are expected to send prices even higher. Predictions are that prices will be up anywhere from $1 to $3. There is a possibility that blast furnace grades, a drag on the market in recent months, could be stronger now that the water shipping season has ended.

Cleveland . . . Auto lists closing this week are expected to bring slightly higher prices but there are a few offsetting factors. While tonnage will be about same as last month in Cleveland at 22,000 tons, there may be some speculation against following months which will be less due to auto production cutbacks. Automotive foundry buying next week is expected to be higher and brokers are doing some hedging against it but finding few takers. Some brokers are still short on November orders and paying through the nose to cover. Some special electric grades going for $54-$55 on fringes of Youngstown area but activity there otherwise quiet.

Birmingham . . . The market continues strong here on both the export and domestic fronts. Prices are holding. Scrap is moving to Atlantic and Gulf Coast ports in large quantities, putting increasing pressure on the mills to pay higher prices to maintain their position in the market. Cast market remains strong.

St. Louis . . . Because of the holidays, there was very little action in the scrap iron market and prices were unchanged. Consumers of rerolling rails have shown some resistance to the present high price and especially since inventories are said to be "comfortable."

Cincinnati . . . Mills resisting market boom heavily and some brokers have dropped buying prices but are finding few takers. Dealers stocks are at good levels and heavy dumping expected in January. Shipments into area by rail and barge have dropped off and Pittsburgh area mills are not interested. Most brokers in area covered on old sales and await outcome of factory lists this week.

Buffalo . . . Market here continues strong with bad weather curtailing scrap shipments. Best steelmaking grades and rails advanced. Other prices are very firm.

Boston . . . Market here is very firm. Best steelmaking grades have jumped $2 on buying by eastern Pennsylvania mills. Export remains strong.

West Coast . . . Mills expect to make melt this month but are worried about signs of renewed vigor in scrap shipments to Japan. Heavy cast scrap buying is reported in San Francisco. Prices are holding firm. Any slack developing in the domestic market is sure to be taken up by export. Situation here is comparable to that on the East Coast, where export buyers have, at times, taken the play away from the mills. Domestic consumers always face this threat.

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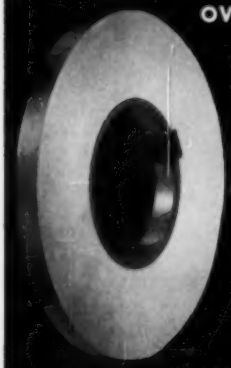

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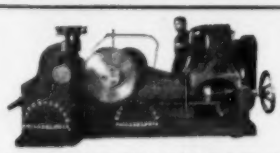

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Scrap Prices *(Effective Dec. 27, 1955)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	53.00 to 54.00
No. 2 bundles	43.00 to 44.00
Machine shop turn	32.00 to 33.00
Mixed bor. and ms. turn	32.00 to 33.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. punch'gs plate	58.00 to 59.00
Heavy turnings	46.00 to 47.00
No. 1 RR. hvy. melting	55.00 to 56.00
Scrap rails, random lgth.	61.00 to 62.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	59.00 to 60.00
RR. spring steel	59.00 to 60.00
RR. couplers and knuckles	59.00 to 60.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	45.00 to 46.00

Chicago

No. 1 hvy. melting	$51.00
No. 2 hvy. melting	42.00
No. 1 factory bundles	55.00
No. 1 dealers' bundles	51.00
No. 2 dealers' bundles	41.00
Machine shop turn.	32.00 to 33.00
Mixed bor. and turn.	34.00 to 35.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos. forge crops	60.00 to 61.00
Low phos. punch'gs plate	57.00 to 58.00
Low phos. 3 ft and under	56.00 to 57.00
No. 1 RR. hvy melting	54.00 to 55.00
Scrap rails, random lgth.	64.00 to 65.00
Rerolling rails	72.00 to 74.00
Rails 2 ft and under	69.00 to 70.00
Locomotive tires, cut	58.00 to 59.00
Cut bolsters & side frames	59.00 to 60.00
Angles and splice bars	66.00 to 67.00
RR. steel car axles	67.00 to 68.00
RR. couplers and knuckles	59.00 to 60.00
No. 1 machinery cast.	56.00 to 57.00
Cupola cast.	52.00 to 53.00
Heavy breakable cast.	44.00 to 45.00
Cast iron brake shoes	41.00 to 42.00
Cast iron car wheels	50.00 to 51.00
Malleable	63.00 to 64.00
Stove plate	43.00 to 44.00

Philadelphia Area

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 bundles	54.00 to 55.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	36.00 to 37.00
Mixed bor. short turn.	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Shoveling turnings	38.00 to 39.00
Clean cast chem. borings	41.00 to 42.00
Low phos. 5 ft and under	57.00 to 58.00
Low phos. 2 ft and under	59.00 to 60.00
Low phos. punch'gs	59.00 to 60.00
Elec. furnace bundles	55.00 to 56.00
Heavy turnings	48.00 to 49.00
RR. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
Rails 18 in. and under	65.00 to 67.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	52.00 to 53.00
Cast iron car wheels	57.00 to 58.00
Malleable	64.00 to 65.00
Unstripped motor blocks	39.00 to 40.00
No. 1 machinery cast.	56.00 to 57.00

Cleveland

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	41.50 to 42.50
No. 1 bundles	51.00 to 52.00
No. 2 bundles	40.00 to 42.00
No. 1 busheling	51.00 to 52.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	30.00 to 31.00
Cut struct'r'l & plates, 2 ft & under	55.50 to 56.50
Drop forge flashings	49.50 to 50.50
Low phos. punch'gs, plate	53.50 to 54.50
Foundry steel, 2 ft & under	55.50 to 56.50
No. 1 RR. heavy melting	55.00 to 56.00
Rails 2 ft and under	70.00 to 71.00
Rails 18 in. and under	71.00 to 72.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	34.00 to 35.00
Railroad cast.	55.00 to 56.00
No. 1 machinery cast.	54.00 to 55.00
Stove plate	50.00 to 51.00
Malleable	57.00 to 58.00

Youngstown

No. 1 hvy. melting	$53.50 to $54.50
No. 2 hvy. melting	43.00 to 45.00
No. 1 bundles	53.50 to 54.50
No. 2 bundles	42.50 to 44.50
Machine shop turn.	29.00 to 30.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. plate	54.50 to 55.50

Buffalo

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 busheling	45.00 to 46.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	46.00 to 47.00
Scrap rails, random lgth.	49.00 to 50.00
Rails 2 ft and under	56.00 to 57.00
RR. steel wheels	50.00 to 51.00
RR. springs steel	50.00 to 51.00
RR. couplers and knuckles	50.00 to 51.00
No. 1 machinery cast.	47.00 to 48.00
No. 1 cupola cast.	42.00 to 43.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles, openhearth	45.00 to 46.00
No. 2 bundles	31.00 to 32.00
New busheling	45.00 to 46.00
Drop forge flashings	44.50 to 45.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Low phos. punch'gs, plate	45.00 to 46.00
No. 1 cupola cast.	42.00 to 43.00
Heavy breakable cast.	36.00 to 37.00
Stove plate	37.00 to 38.00
Automotive cast.	45.00 to 46.00

St. Louis

No. 1 hvy. melting	$41.50 to $42.50
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	29.00 to 30.00
Cast iron borings	31.00 to 32.00
Shoveling turnings	31.00 to 32.00
No. 1 RR. hvy. melting	55.00 to 56.00
Rails, random lengths	60.50 to 61.50
Rails, 18 in. and under	66.00 to 67.00
Locomotive tires uncut	59.00 to 60.00
Angles and splice bars	59.00 to 60.00
Std. steel car axles	61.00 to 62.00
RR. specialties	60.00 to 61.00
Cupola cast.	53.00 to 54.00
Heavy breakable cast.	40.00 to 42.00
Cast iron brake shoes	42.00 to 43.00
Stove plate	41.00 to 42.00
Cast iron car wheels	50.00 to 51.00
Rerolling rails	70.00 to 71.00
Malleable	50.00 to 51.00
Unstripped motor blocks	41.00 to 42.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	42.00 to 43.00
No. 1 busheling	45.00 to 46.00
Elec. furnace, 3 ft & under	44.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and short turn	26.00 to 27.00
Shoveling turnings	27.00 to 28.00
Clean cast chem. borings	26.00 to 27.00
No. 1 machinery cast.	45.00
Mixed cupola cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Stove plate	38.00 to 39.00
Unstripped motor blocks	27.00 to 28.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy melting	$48.00 to $49.00
No. 2 hvy. melting	44.00 to 45.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	28.00 to 29.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast.	47.00 to 48.00
Mixed yard cast.	45.00 to 46.00
Charging box cast.	46.00 to 47.00
Heavy breakable cast.	46.00 to 47.00
Unstripped motor blocks	30.00 to 31.00

Birmingham

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 bundles	43.00 to 44.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	18.00 to 19.00
Electric furnace bundles	47.00 to 48.00
Bar crops and plate	53.00 to 54.00
Structural and plate, 2 ft	50.00 to 51.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	57.00 to 58.00
Rails, 18 in. and under	63.00 to 64.00
Angles & splice bars	60.00 to 61.00
Rerolling rails	64.00 to 65.00
No. 1 cupola cast.	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast.	30.00 to 31.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	39.00 to 40.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	29.00 to 30.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	30.00 to 31.00
Low phos. 18 in. & under	55.00 to 56.00
Rails, random lengths	61.00 to 62.00
Rails, 18 in. and under	68.00 to 69.00
No. 1 cupola cast.	46.00 to 47.00
Hvy. breakable cast.	44.00 to 45.00
Drop broken cast.	54.50 to 55.50

San Francisco

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 1 bundles	41.00
No. 2 bundles	36.00
No. 3 bundles	29.00
Machine stop turn.	20.00
Cast iron borings	20.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast.	50.00

Los Angeles

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 1 bundles	41.00
No. 2 bundles	33.00
No. 3 bundles	29.00
Machine shop turn.	20.00
Shoveling turnings	23.00
Cast iron borings	20.00
Elec. furn. 1 ft and under	42.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast.	48.00

Seattle

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	40.00
No. 2 bundles	34.00
No. 3 bundles	30.00
No. 1 cupola cast.	40.00
Mixed yard cast.	40.00

Hamilton, Ont.

No. 1 hvy. melting	$43.50
No. 2 hvy. melting	39.50
No. 1 bundles	43.50
No. 2 bundles	36.00
Mixed steel scrap	37.50
Bushelings	33.50
Bush., new fact. prep'd	41.50
Bush., new fact. unprep'd.	37.50
Machine shop turn.	16.00
Short steel turn.	26.50
Mixed bor. and turn.	$16.00 to 17.00
Rails, rerolling	52.50
Cast scrap	42.00 to 46.00

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Copper Continues Critical

Chile copper strike may run into 1956 . . . 8000 tons of ore per week being lost . . . Outlook obscure for consumers in new year . . . Aluminum export eased.

◆ SITUATION in the strike of copper workers in Chile against their government is basically unchanged. This is bad news for the copper consumers of the world. Already 8000 tons of copper ore can be deducted from estimates of 1955 world copper mine production.

But worse than that is the news that previously decided on strategy of the Chilean government to break the strike may have to be completely revised. This means at least another full week of inactivity—and another 8000 tons of lost production.

As has been reported, the Ibanez government was prepared with a strong list of threats. If they failed, they were to be followed by mass arrests or mass military conscription. Union management indoctrinated its workers to the extent that the threats fell flat.

When the government moved in for arrests all they could find were a few of the leaders. The rank-and-file quietly dispersed. There are no picket lines. And nowhere in the area more than two or three workers congregated.

To attempt mass arrests or conscription would be a long and tedious job. In the long run it would be ineffective and hold the government up to ridicule. What will happen next is anybody's guess, but it will have to happen soon. As close as can be figured, the Chilean coffers have lost $3.7 million in revenue the government can ill afford.

The suggestion has been advanced that the American subsidiary producers meet the union demands pending redrafting of the labor law that appears to be causing all this trouble. But there is little chance of this since it seems to be a policy of the companies to follow the letter of the law, no more and no less. Also, the demands of the unions were originally defeated by a coalition of government and producers. It seems to be to the companies' advantage to stick with the government. As the situation stands now, the Chilean government refuses to talk about a new law until work is resumed and the workers refuse to mine copper until a new law is passed.

In the U. S. there seems to be a wide difference of opinion on what can be expected in the copper market in 1956. The Copper and Brass Research Association predicts a balance between supply and demand as early as the first quarter 1956. This is based on assumption of no crippling strikes; and yet one is already in progress that may carry over into 1956.

Bache & Co., investment brokers, calls many of the moves made by the copper industry in 1955 wishful thinking and infers that, if a more realistic approach is not adopted, the strangling supply-demand situation will continue.

Thus far the market has been relatively quiet in both London and New York as if waiting for something to break. Considering all things involved, it might be wise for the copper consumer not to count on getting all the metal he needs in 1956 nor to establish the price of his finished product on producers copper at 43¢.

SCRAP EXPORTS . . . Government will permit exporters to ship 33 pct more aluminum scrap overseas in the first three months of 1956. But it will continue to exercise tight controls over nickel scrap shipments.

Quota for shipments of aluminum scrap has been increased to 6000 tons for the first quarter of the year, up 2000 tons over the final three months of 1955. The quota includes remelt ingots.

Exports of leaded aluminum foil scrap will not be charged against the first quarter quota if exporters show they are unable to sell the foil commercially in this country. Scrap containing 70 pct or less aluminum will be figured against the quota on the basis of the net weight of the aluminum alloys. Applications covering aluminum scrap must show that the metal is available to export. Primary and secondary aluminum and alloys in crude form will continue under open end export licensing.

TUNGSTEN . . . The Tungsten Institute has signed a contract with Stanford Research Institute, Menlo Park, Calif., calling for a research program aimed at developing the maximum usefulness of tungsten in high temperature alloys. Reason for the move is probably that in 1954 over 13 million lb were produced in this country and only 4 million lb consumed.

TIN . . . Abdul Rahman, head of the Malayan government, has declared an all-out war against the bands of communist terrorists who have been preventing the tin companies from searching out new sources. This could mean an eventual long range easing in the tin market which up until now has given indications of tightening up until demand exceeds supply.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Dec. 21	Dec. 22	Dec. 23	Dec. 24	Dec. 26	Dec. 27
Copper, electro, Conn.	43.00	43.00	43.00	....	....	43.00
Copper, Lake, delivered	43.00	43.00	43.00	....	....	43.00
Tin, Straits, New York	109.25	109.25	109.25	109.25	109.375	109.375
Zinc, East St. Louis	13.00	13.00	13.00	13.00	....	13.00
Lead, St. Louis	15.30	15.30	15.30	15.30	....	15.30

Note: Quotations are going prices *Tentative

Nonferrous Prices *(Effective Dec. 27, 1955)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003	40.8	38.7	37.5	36.5
5052	48.3	43.4	41.7	39.9
6061-0	45.4	41.2	39.4	39.3

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	41.6–43.3	56.6–60.2
12-14	42.3–43.7	57.5–61.8
24-26	45.3–45.7	67.7–72.1
36-38	53.6–54.2	90.5–94.3

Screw Machine Stock—2011-T-3

Base*	¾	¾–⅞	⅞–1	1¼–1½
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length* →	72	96	120	144
.019 gage	$1.295	$1.727	$2.160	$2.590
.024 gage	1.615	2.162	2.692	3.232

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 61¢; 3/16 in., 62¢; ½ in., 61¢; 0.064 in., 78¢; 0.032 in., 99¢. Specification grade higher. Base, 30,000 lb.

Extruded Round Rod: FS, diam ¼ to 0.311 in., 82.5¢; ½ to ⅝ in., 65¢; 1¼ to 1.749 in., 60.5¢; 2½ to 5 in., 57¢. Other alloys higher. Base up to ⅝ diam, 10,000 lb; ⅝ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: FS. In weight per ft for perimeters less than size indicated: 0.10 to 0.11 lb, 3.5 in., 70.7¢; 0.22 to 0.25 lb, 5.9 in., 66.9¢; 0.50 to 0.59 lb, 8.6 in., 63¢; 1.8 to 2.59 lb, 19.5 in., 60.8¢; 4 to 6 lb, 28 in., 57.7¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: FS, 0.049 to 0.057 in. wall thickness: OD ¼ to 5/16 in., $1.625; 5/16 to ⅜ in., $1.475; ½ to ⅝ in., $1.105; 1 to 2 in., 92.5¢; 0.165 to 0.219 in. wall: OD ⅝ to ⅞ in., 75.5¢; 1 to 2 in., 71.5¢; 3 to 4 in., 70.5¢. Other alloys higher. Base OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	63.13	....	63.48
Copper, h-r	58.76	59.11	....
Copper, drawn	....	60.36	....
Low brass	56.55	56.49	....
Yellow brass	52.27	52.21	....
Red brass	58.09	58.03	....
Naval brass	52.83	49.94	48.40
Leaded brass	....	....	48.42
Com. bronze	60.18	60.12	....
Mang. bronze	59.39	53.38	54.94
Phos. bronze	81.00	81.50	....
Muntz metal	53.74	49.55	50.80
Ni silver, 10 pct	66.90	68.33	70.68

Beryllium copper, CR, 1.9% Be, Base 2000 lb, f.o.b.

Strip	$1.84
Rod, bar, wire	1.81

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	82	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless Tube	122	110	153
Shot, Blocks	...	71	...

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	24.40
Aluminum pig	22.50
Antimony, American, Laredo, Tex.	33.50
Beryllium copper, per lb cont'd Be	$43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	43.00
Copper, Lake, delivered	43.00
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $120
Lead, St. Louis	15.30
Lead, New York	15.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	32.50
ingot	33.25
Magnesium, sticks, 100 to 500 lb.	53.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$280 to $285
Nickel electro	64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel	60.75
Palladium, dollars per troy oz.	$22.20 to $24
Platinum, dollars per troy oz.	$97 to $99
Silver, New York, cents per troy oz.	90.50
Tin, New York	109.375*
Titanium sponge, grade A-1	$3.45
Zinc, East St. Louis	13.00
Zinc, New York	13.50
Zirconium, sponge	$10.00

* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	42.00
No. 120	41.25
No. 123	40.50
80-10-10 ingot	
No. 305	45.75
No. 315	44.00
88-10-2 ingot	
No. 210	58.25
No. 215	54.75
No. 245	48.75
Yellow ingot	
No. 405	33.25
Manganese bronze	
No. 421	37.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	32.75-34.00
0.60 copper max.	32.50-33.75
Piston alloys (No. 122 type)	31.50-32.50
No. 12 alum. (No. 2 grade)	31.00-31.50
108 alloy	31.00-31.50
195 alloy	32.50-34.00
13 alloy (0.60 copper max.)	32.50-33.75
AXS-679	31.00-31.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½%	31.25-32.25
Grade 2—92-95%	30.25-31.25
Grade 3—90-92%	29.50-30.50
Grade 4—85-90%	29.00-29.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	39	38¼
Yellow brass	28⅝	26⅝
Red brass	34⅛	33⅛
Comm. bronze	35⅝	35
Mang. bronze	27	25⅝
Yellow brass rod ends	28⅝	

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	43⅛
No. 2 copper wire	42
Light copper	39⅛
*Refinery brass	39

* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	43⅛
No. 2 copper wire	41
Light copper	39
No. 1 composition	35⅛
No. 1 comp. turnings	34⅛
Hvy. yellow brass solids	24⅛
Brass pipe	29
Radiators	28

Aluminum

Mixed old cast	21½—22
Mixed new clips	22 —23
Mixed turnings, dry	20½—22

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	41½—42
No. 2 heavy copper and wire	38½—39
Light copper	36 —36½
New type shell cuttings	36 —36½
Auto radiators (unsweated)	24 —24½
No. 1 composition	31½—32
No. 1 composition turnings	29½—30
Unlined red car boxes	24½—25
Cocks and faucets	24½—25
Clean heavy yellow brass	21 —21½
Brass pipe	25½—26
New soft brass clippings	25½—26
No. 1 brass rod turnings	23½—24

Aluminum

Alum. pistons and struts	17 —17½
Aluminum crankcases	16⅝—17
1100 (2S) aluminum clippings	20½
Old sheet and utensils	16⅝—17
Borings and turnings	11½—12
Industrial castings	16⅝—17
2024 (24s) clippings	18½—19

Zinc

New zinc clippings	8 — 8½
Old zinc	5½— 6
Zinc routings	4
Old die cast scrap	3½

Nickel and Monel

Pure nickel clippings	$1.25
Clean nickel turnings	$1.00
Nickel anodes	$1.25
Nickel rod ends	$1.25
New Monel clippings	54½
Clean Monel turnings	44
Old sheet Monel	50
Nickel silver clippings, mixed	23
Nickel silver turnings, mixed	19

Lead

Soft scrap lead	12 —12½
Battery plates (dry)	6½— 6⅝
Batteries, acid free	4¼

Magnesium

Segregated solids	18½—19
Castings	17½—18

Miscellaneous

Block tin	81 —82
No. 1 pewter	64 —65
Auto babbitt	43 —44
Mixed common babbitt	15
Solder joints	20 —20½
Siphon tops	17
Small foundry type	16¼
Monotype	15
Lino. and stereotype	14 —14¼
Electrotype	12 —12¼
Hand picked type shells	10½—11
Lino. and stereo. dross	6
Electro. dross	5

IRON AGE

STEEL PRICES

(Effective Dec. 27, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*	6.25 *P7*				
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16,* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C16*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective Dec. 27, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			*W6*			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.025 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.125 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.325 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.025 *A5, N4,R3*			
	Sterling, Ill.										5.125 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.025 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1,Y1*	5.325 *I3, U1,Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1,I3*	7.875 *U1, Y1*			5.025 *Y1*	$9.20 *I3, U1,Y1*	$7.90 *I3, U1,Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.	4.425 *C9*		5.95 *C9*						5.475 *C9*	5.125 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3,N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1,P6*	5.325 *J3, U1,P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *A5, P6*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.025 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5,F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.275 *S3*			
	Los Angeles, Torrance, Cal.										5.825 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.375 *C7*	6.80 *C7*							5.075 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.275 *S2*			

† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box.

* COKES: 1.50-lb. add 25¢.

ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.

IRON AGE

STEEL PRICES

(Effective Dec. 27, 1955)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.S. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	5.95 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.25 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.25 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.35 *W10*		7.60 *W10*						
	Camden, N. J.			6.35 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.45 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.35 *B3*
	Palmer, Worcester, Readville, Mass.			6.35 *W11* 6.45 *B5,C14*		7.725 *A5,B5*		4.50 *R3*				6.55 *A5*, *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		5.90 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E3*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	5.90 *A5,W10, W8,B5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,A1,R3*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.25 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	5.90 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.80 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.25 *A5 C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.10 *B5,P8* 6.15 *P3*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3 P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.25 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	5.90 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G3*				
	Kokomo, Ind.											6.35 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.35 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		5.90 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	5.90 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.25 *A5, J3, P6*
	Portsmouth, Ohio											6.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W9*				
	Youngstown, Ohio	4.65 *U1, Y1, C10,R3*	4.65 *U1, Y1, R3*	5.90 *Y1, U1*	5.575 *U1, Y1, C10*	7.425 *Y1,C10 F2*	6.80 *U1, Y1*	4.50 *U1, Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.50 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.20 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C8*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.25 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.90 *S2*		6.40 *S3*	6.825 *S2*	6.50 *S2*

Steel Prices *(Effective Dec. 27, 1955)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct.) f.o.b. mills. Base price about $200 per net ton

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75								
Fontana *K1*	7.00	+8.25	10.00	+4.25	10.50	+.75	15.00	+0.00	15.50	1.00	16.00	1.50	17.50	1.25								
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75								
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75								
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Fontana *K1*	11.50		15.50		17.50		18.00		18.50		19.00		19.50									
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2½ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb, East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅛, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt. e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	3	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium ..... .77
Oil hardened manganese ..... .42
Special carbon ..... .39
Extra carbon ..... .33
Regular carbon ..... .275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.60	34.85	37.75	37.25
	347	34.40	37.90	41.40	46.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (*B9*) Copper, 10 pct, 2 sides, 35.00; 1 side, 30.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher

LAKE SUPERIOR ORES

51.50% *Fe; natural content, delivered Lower Lake ports. Prices effective for 1956 season.*

	Gross Ton
Openhearth lump	$11.25
Old range, bessemer	10.40
Old range, nonbessemer	10.25
Mesabi, bessemer	10.25
Mesabi, nonbessemer	10.10
High phosphorus	10.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb
	Col	Col	Col	Col	Col	¢/lb.	¢/lb
Alabama City *R3*	152	162	...	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	...	...	...	7.40	7.80
Atlanta *A8*	154	167	...	175	180	7.50	8.025
Bartonville *K2**	154	166	...	175	181	7.50	8.075
Buffalo *W6*	...	...	...	...	...	7.40	7.80
Chicago, Ill. *N4***	152	166	...	173	179	7.40	8.00
Cleveland *A6*	157	...	...	...	...	7.40	...
Cleveland *A9*	...	...	...	...	...	7.40	...
Crawfordsville *M4**	154	167	...	175	175	7.50	8.05
Donora, Pa. *A5*	152	162	...	173	175	7.40	7.80
Duluth *A5*	152	162	...	173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162	...	173	175	7.40	7.80
Galveston *D4*	157	...	...	...	...	...	...
Houston *S2*	167	176	...	...	180	7.65	8.05
Johnstown, Pa. *B3**	152	166	...	...	175	7.40	7.80
Joliet, Ill. *A5*	152	162	...	173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154	...	175	177	7.50	7.90
Los Angeles *B3**	...	...	...	...	...	8.35	8.925
Kansas City *S2*	167	,174	...	,78	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162	...	...	...	7.40	7.80
Moline, Ill. *R3*	...	162	162	...	...	...	...
Pittsburg, Cal. *C7*	171	185	...	...	195	8.35	8.75
Portsmouth *P7*	...	...	...	...	...	7.40	...
Rankin, Pa. *A5*	152	162	...	...	175	7.40	7.80
So. Chicago *R3*	152	162	157	173	175	7.40	7.80
S. San Francisco *C6*	...	...	...	197	195	8.35	8.75
Sparrows Pt. *B3**	154	...	...	175	181	7.50	8.075
Struthers, O. *Y1*	...	...	...	...	...	7.40	7.90
Worcester *A5*	158	...	...	...	...	7.70	...
Williamsport, Pa. *S5*	...	...	166	...	...	...	...

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bristol, Conn., *W12*	...	...	10.80	12.95	15.65
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	...	8.95	10.50	12.65	15.35
Cleveland *A9*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.10	9.05	10.60	12.75	...
Detroit *D3*	7.10	9.05	10.60	...	...
Harrison, N. J. *C11*	...	...	10.80	12.95	15.65
Indianapolis *C5*	7.15	9.10	10.55	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	...
New Haven, Conn. *D1*	7.45	9.25	10.80	12.95	...
Pawtucket, R. I. *N7*	7.55	9.25	10.80	12.95	15.65
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.00	8.95	10.50	12.65	15.35
Trenton *R4*	...	...	...	...	...
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T6*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	...	...
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C3*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (18 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.83	8.32	8.37	7.65	.....	7.21	7.93	7.61	8.62	14.38	13.44-13.96	16.36	16.29-16.40
Birmingham	.15	6.80	7.93	8.65	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	7.70	8.81-9.36	10.27	7.94-7.96	10.30	7.69	8.13	7.83	9.53	12.15-13.80	13.45-13.10	16.65	16.50
Buffalo	.30	6.80	7.90	9.70	7.15	.....	7.15	7.46	7.10	7.90	.....	.....	.....	16.15
Chicago	.25	6.80	8.09	8.50	7.06	.....	6.99	7.28	7.08	7.75	13.28	12.85	16.05	15.90
Cincinnati	.25	6.92	8.33	8.90	7.30	.....	7.28	7.75	7.32	8.05	13.44	31.09	16.29	16.14
Cleveland	.30	6.80	8.00	8.85	7.16	.....	7.16	7.61	7.14	7.85	.....	12.91	.....	15.96
Denver	.....	8.60	10.76	11.22	8.90	.....	8.66	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.25	6.99	8.28	8.78	7.34	8.15	7.27	7.75	7.36	8.04	13.40	13.05	16.25	16.10
Houston	.....	7.85	8.75	10.40	8.15	.....	7.86	8.28	8.25	9.85-9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.05	10.00	11.00	8.35	.....	8.05	8.38	8.05	10.70	.....	14.25	.....	17.85
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.68	7.40	9.15	.....	.....	.....	.....
Milwaukee	.25	6.89	8.18	8.59	7.15	.....	7.08	7.45	7.17	7.94	.....	12.94	.....	15.99
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.46	8.68	9.44	8.07	11.10	7.76	7.98	7.96	9.48	15.61	13.28	16.48	16.33
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.58	.....	.....	.....	.....
Philadelphia	.10	7.14	8.42	9.35	7.67	.....	7.37	7.74	7.64	8.46	13.36-13.51	13.16	16.36	16.21
Pittsburgh	.25	6.80	8.09	9.20	7.16	9.00	6.99	7.28	7.08	7.85	13.20	12.85	16.05	15.90
Portland	.....	7.80-8.60	8.80-10.15	10.65	8.00	7.93	7.75	7.85-8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.40	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.10	9.65	10.15	8.35	.....	8.05	8.25	8.05	11.20*	.....	14.25	.....	17.85
Seattle	.00	8.55	10.40	10.80	8.85	.....	8.20	8.30	8.35	11.70	.....	14.60	.....	17.65
St. Louis	.25	7.09	8.38	9.19	7.35	.....	7.28	7.68	7.37	8.14	13.09	13.14	16.35	16.19
St. Paul	.25	7.48	8.59-9.14	9.16	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

* Plus analysis charge.

(Effective Dec. 27, 1955)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.725	5.65	5.825	.....	.....	.....	.....
So. Chicago *R3*	.....	.....	.....	7.90	.....	.....	.....
Ensley *T2*	4.725	5.65	.....	7.90	.....	5.625	.....
Fairfield *T2*	.....	5.65	.....	7.90	.....	5.625	.....
Gary *U1*	4.725	5.65	.....	.....	.....	5.625	.....
Ind. Harbor *I3*	4.725	.....	5.825	7.90	.....	5.525	.....
Johnstown *B3*	.....	5.65	.....	.....	.....	.....	.....
Joliet *U1*	.....	5.65	5.825	.....	.....	.....	.....
Kansas City *S2*	.....	.....	.....	7.90	.....	.....	.....
Lackawanna *B3*	4.725	5.65	5.825	.....	.....	5.625	.....
Minnequa *C6*	4.725	5.15	5.825	7.90	.....	5.625	12.40
Pittsburgh *O1*	.....	.....	.....	.....	11.90	.....	12.40
Pittsburgh *P5*	.....	.....	.....	.....	.....	.....	12.40
Pittsburgh *J3*	.....	.....	.....	7.90	.....	.....	.....
Seattle *B2*	.....	.....	.....	8.40	.....	5.775	12.90
Steelton *B3*	4.725	.....	5.825	.....	.....	5.625	.....
Struthers *Y1*	.....	.....	.....	7.90	.....	.....	.....
Torrance *C7*	.....	.....	.....	.....	.....	5.775	.....
Williamsport *S5*	.....	5.65	.....	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	7.90	.....	.....	.....

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $14.00 to $14.50
Foundry, beehive (f.o.b. oven)
Connellsville, Pa. ..... $16.00 to $16.50
Foundry, oven coke
Buffalo, del'd $28.08
Chicago, f.o.b. 25.75
Detroit, f.o.b. 26.25
New England, del'd 26.95
Seaboard, N. J., f.o.b. 25.50
Philadelphia, f.o.b. 25.00
Swedeland, Pa., f.o.b. 25.00
Plainesville, Ohio, f.o.b. 25.50
Erie, Pa., f.o.b. 25.00
Cleveland, del'd 27.42
Cincinnati, del'd 26.56
St. Paul, f.o.b. 23.75
St. Louis, f.o.b. 26.00
Birmingham, f.o.b. 24.40
Lone Star, Tex., f.o.b. 19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
6	60	27.25	12	60	11.75
4	60	30.25	10	60	11.80
3	60	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb., frt allowed in quantity)

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots 58.92
Electrodeposited 55.25
Brass, 80-20, ball anodes, 2000 lb or more 58.00
Zinc, ball anodes, 2000 lb. lots 20.75
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon .. 90.50
(rolled depolarized add 3¢ per lb)
Cadmium $1.70
Tin, ball anodes and elliptical $1.06 to $1.10

Chemicals

(Cents per lb., fob shipping point)

Copper cyanide, 100 lb drum 83.50
Copper sulphate, 5 or more 100 lb bags, per cwt 18.15
Nickel salts, single, 4-100 lb bags .. 33.25
Nickel chloride, freight allowed, 300 lbs 43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums 21.55
(Philadelphia add .50 per lb)
Zinc cyanide, 100 to 900 lb 55.55
Potassium cyanide, 100 lb drum N. Y. 48.00
Chromic acid, flake type, 1 to 20 100 lb drums 31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	68
Larger than ½ in. diam. and all diam. longer than 6 in.	58	67
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	68
Lag, all diam. x 6 in. & shorter	61	68
Lag, all diam. longer than 6 in.	58	67
Plow bolts	61	68

Nuts, Hex., H.P., reg. & hvy.

⅝" or smaller	64	66
⅞" to 1⅛" inclusive	63	66
1¼" to 1½" inclusive	66	67
1⅝" and larger	61	63

C.P. Hex. regular & hvy.

⅝" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

⅝" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount *H.C. Heat*
Bright Treated	
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34 30
9/16 and ⅝" x 6" and smaller and shorter ..	31 16
⅝", ¾", 1" x 6" and shorter	9 +11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49 41
9/16" and ⅝" diam. x 6" and shorter	43 39
⅝", ¾", 1" x 6" and shorter	31 30

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ⅝", ¾", 1" diam.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Stove Bolts
Packaged, package list ...		37	38
Bulk, bulk list			
	Quantity		
¼-in. diam. & under	25,000-100,000	30	41
5/16-in. diam. & larger	15,000-100,000	30	41
All diam. over 3 in. long	5,000-100,000	—	41

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
Packaged, package list ...		34	37
Bulk, bulk list			
	Quantity		
⅜-in. diam. & smaller	25,000-200,000	18	30

CAST IRON WATER PIPE INDEX

Birmingham	109.3
New York	121.6
Chicago	122.9
San Francisco-L. A.	131.1

Nov. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 87, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa., (except Salina, Pa., add $5.00) $122.00
No. 1 Ohio ....
Sec. quality, Pa., Md., Ky., Mo., Ill. 114.00
No. 2 Ohio 98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala. $128.00
Childs, Hays, Pa. 135.00
Chicago District 138.00
Western Utah 144.00
California 151.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O. 145.00
Curtner, Calif. 163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 21.00
Silica cement, net ton, bulk, Hays, Pa. 24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala. 22.00
Silica cement, net ton, bulk, Utah and Calif. 22.00

Chrome Brick *Per net ton*

Standard chemically bonded, Balt. $91.00
Standards chemically bonded, Curtner, Calif. 101.38
Burned, Balt. 86.00

Magnesite Brick

Standard Baltimore $114.00
Chemically bonded, Baltimore 103.00

Grain Magnesite *Bt. ⅝-in. grains*

Domestic, f.o.b. Baltimore in bulk fines removed $64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 38.00
in sacks 46.00

Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $15.00
Midwest 15.60
Missouri Valley 14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags ... 9.50¢
Canadian sponge iron, Del'd in East, carloads ... 9.5¢
Domestic sponge, iron, 98+% Fe, carload lots ..... 9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe ..... 27.5¢
domestic 99.5+% Fe ..... 36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe 57.0¢
Electrolytic Iron melting stock, 99.84% pure ..... 22.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 00.8+% Fe .. 86.0¢ to $1.55
Aluminum freight allowed .. 34.50¢
Brass, 10 ton lots .....37.50¢ to 50.00¢
Copper, electrolytic ..... 61.50¢
Copper, reduced ..... 61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value
Chromium, electrolytic, 99% min., and quality, del'd... $3.60
Lead .....7.50¢ plus metal value
Manganese ..... 70.0¢
Molybdenum, 99% .....$3.00 to $3.25
Nickel, unannealed $1.06
Nickel, annealed $1.08
Nickel, spherical, unannealed, 325 ..... $1.13
Silicon ..... 43.50¢
Solder powder .7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 99.0¢
Stainless steel, 316 ..... $1.33
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh) $4.50
Zinc, 10 ton lots .....18.75¢ to 32.50¢

Ferroalloy Prices

(Effective Dec. 27, 1955)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.06% C	36.50	0.50% C	35.25
0.10% C	36.00	1.00% C	34.00
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si ... 26.25
5.50-5.00% C, 67-64% Cr, 2.00-4.00% Si ... 25.00

S. M. Ferrochrome

Contract prices, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	28.65
Ton lots	30.55
Less ton lots	32.05

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 3¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.36

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.

30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	22.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-8; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	9.50
Clairton, Pa.	9.50
Sheridan, Pa.	10.25
Ohio, Ohio	9.50

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.50
Ton lots packed	14.70

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	2% max.	$89.50
19 to 21%	3% max.	91.50
21 to 23%	3% max.	94.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.00
Ton lots	43.50

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 31.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	32.00	33.85	35.05
0.07% max. C	30.95	31.80	33.80
0.15% max. C	29.45	30.30	31.50
0.30% max. C	27.95	28.80	30.00
0.50% max. C	27.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	11.20
Ton lots	12.65
Briquet contract basis carloads, bulk, delivered, per lb of briquet	12.70
Ton lots, packed	14.90

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $98.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.30
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

50% Si	11.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
		90% Si	18.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ... $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta ... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo ... $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ... $90.00

10 tons to less carload ... $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.50

Less ton lots ... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... $177.00

Ferrotungsten, ½ x down, packed, per pound contained W, ton lots, f.o.b. ... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ... $1.33

bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	16.50¢
Ton lots, packed lump	16.75¢
Less ton lots	$1.55

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ... $1.32

Zirconium contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd, lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si 40-45%, per lb contained B ... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2% Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed

Ton lots per pound ... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20

F.o.b. Wash., Pa.; 100 lb up	
10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 2.00% max. C, 2 in. x D, del'd.

Ton lots	$1.40
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.05

Silcas, contract basis, delivered.

Ton lots ... 45.00¢

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News of Used and Rebuilt Machinery

Pittsburgh Market Active . . . Used equipment dealers and rebuilders in the Pittsburgh area are finding themselves in the same position as just about everybody else in the steel industry. Demand has completely outstripped the supply of good used equipment. In general, business for the dealer is dependent on what he can buy, rather than on what he can sell.

Inquiries are as strong or stronger than at anytime this year. Customers are willing to settle for equipment that is close to specifications or which can be rebuilt or adapted to their use.

Even under these conditions, dealers are hard put to find equipment. Customers who are buying new equipment are in many cases holding on to their old machinery and either using it as is or rebuilding it to step up production.

Rebuilders are in a bad way because they are finding a shortage of materials necessary to do the rebuilding job. This is particularly true of structurals, beams, channels and angles.

Shop Trade Picks Up . . . Machine shop trade continues to pick up as evidenced by the increased strength of the smaller shops. Many of them thought they would have closed their doors by this time a year ago. But today, they are holding their own and in some cases expanding slightly.

Most are still not in a position to buy equipment, however. Machine tool dealers are finding that the large equipment needed in big shops is very scarce. Business was substantially improved over 1954 and dealers expect to hold the sales line through 1956 if they have a little better luck obtaining equipment for resale.

How About Cranes? . . . Crane business was strong throughout 1955, despite one or two poor months earlier in the year. Small cranes are still moving in largest volume, mainly because they are more available.

Heavy, wide-span cranes are hard to come by and the demand is increasing. Inquiries are coming from all parts of this country as well as from Canada and Mexico. One Canadian mill is scheduled to go into operation January 15, but at this late date it's desperately trying to find a suitable crane.

Need Mill Equipment . . . All kinds of steel mill equipment is in strong demand. Mills are straining equipment to a point where life spans are being shortened while at the same time general expansions are under way.

One large dealer reports that at the end of his fiscal year, Sept. 1, sales were substantially improved over the previous year. Since Sept. 1, still further gains have been made in sales volume. Export sales are up considerably over 1954 and on the basis of current inquiries will remain strong in 1956.

Electrical equipment builders are handling all the work they can. Shops are running full tilt.

An Amazing Sale . . . Most bids on the machinery offered at the Cleveland-Akron-Youngstown Machine Co. auction at Hudson, Ohio, came to a third or more higher than had been anticipated.

The public sale included disposal of C.A.Y.'s machinery, land, and buildings. Last October, the firm's shareholders voted voluntary dissolution and the board of directors set a $90,000 value on the company's machine tools and equipment.

Final auction bids, however, came to 30 pct more than this figure.

Most sales went to smaller tools, with heavy machinery limited to four bidders with tool plants of their own.

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ANGLE BENDING ROLLS
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#122P-66 Logemann, Charging Box 66x18x24. Produces Bale 125 to 150 lbs.
#125-TC Galland Henning. Volume of Box 145 cu. ft., Bale Size 500 to 800 lbs.
BENDING ROLLS
8'x3/16" Bertsch Initial Type
10' x 1¼" Bertsch Initial Type
12' x ⅝" Niles Pyramid Type
14' x ½" Bertsch Initial Type Bending Roll
18' x ⅝" Wickes Pyramid Type
24' Hilles & Jones Pyramid Type
BRAKES—LEAF TYPE
12' x ⅜" Dreis & Krump
12' x ½" Dreis & Krump, Motor Driven
BRAKES—PRESS TYPE
12' All Steel Press Brake, 250 ton Capacity
12' x 5/16" Pacific Hydraulic, 300 ton
BROACH
Model VP-4-40-49 American Vertical Hydr. Broach. Max. Capacity 60 ton, Stroke 40", Motor Drive
CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span	230 Volt D.C.
5 ton Northern	50' Span	230 Volt D.C.
5 ton Cleveland	98' Span	230 Volt D.C.
7½ ton P&H	65' Span	440/3/60 A.C.
10 ton P&H	58' Span	230 Volt D.C.
10 ton Milwaukee With 5 ton Auxiliary	80' Span	230 Volt D.C.
10 ton P&H	56' Span	220 Volt D.C.
15 ton P&H	56' Span	230 Volt D.C.
20 ton P&H	60' Span	230 Volt D.C.
20 ton Toledo	75' Span	550/3/60 A.C.
30 ton Alliance With 10 ton Auxiliary	50' Span	220 Volt D.C.
120 ton Whiting With 10 ton Auxiliary	80' Span	220/3/60 A.C.

FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine
FORGING MACHINES
1" to 5" Acme, Ajax, National
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15 ton Heroult Top Charge, With Transformer
HAMMERS—BOARD DROP—STEAM DROP
STEAM FORGING—800 lb. to 20,000 lb.
LEVELERS—ROLLER
52" McKay 17 Rolls 2¾" Dia.
72" McKay 15 Rolls 4½" Dia.
PRESSES—HYDRAULIC
300 ton United Steam Hydr. Forging Press
550 ton Baldwin Southwark 12" Stroke 48" x 25" Between Columns
800 ton Clearing 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting 46" Stroke, Bed Area 72" x 146"
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
2045 ton Birdsboro, 4 Columns, 14" Stroke Platen 42" x 46" Daylite 47"
4500 ton B-L-H Hydr. Forging Press
PRESS—Straight Side
Clearing Model TF41500-300 Triple Acting. Strokes 40, 32, 14", Bed Area 100" x 200"
Verson 81-40 Mech. Eccentric Type Single Point Suspension Press, 200 ton, 30" Stroke
Bliss #9E Double Crank, 500 ton, 16" Stroke, Bed Area 51" x 120"
PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
Style EF Cleveland 36" Throat, Punch 1¼" thru 1"
Style W Cleveland Single End, 60" Throat, 3½ Ton

ROLL—PLATE STRAIGHTENING
10' Hilles & Jones, Six Rolls 14" Dia.
ROLLING MILLS
13" x 24" Garrison Single Stand Two High
16" x 24" Farrel F&M Two Stand Two High
16" x24" United Single Stand Two High
20" x 36" Hoagland Single Stand Two High
22" x 40" Lewis Three High
ROLLS—FORMING
8 Stand Rafter Tube Forming Machine, Spindle 1⅞" 5 Stand Hilts Roll Forming Machine, Shaft 2⅞"
SHEAR—GATE
80" x ⅜" Pels
SHEAR—ANGLE
6 x 6 x ⅝" Hilles & Jones
6 x 6 x 1" Long & Allstatter Size B
SHEAR—BAR
#4 H&J Guillotine, Capacity 3½" Square, 4" Round
SHEARS—ROTARY
¼" Kling #250, With Flanging Attachment
½" Quickwork Whiting #04A—NEW 1953
SHEARS—SQUARING
10'x 12 Ga. Niagara No. 501B
12' x ⅝" Loy & Nawrath
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18" Yoder, Pay-off, Scrap Winder, Rewinder 2½" dia. shaft
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2	3000	Whse.	Mill	525	600
6	1500	Whse.	Mill	525	600
1	1250	G.E.	MCF	600	450/700
4	800	Whse.	Encl.	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	500	Whse.	Mill	250	285/710
1	450/250	Al. Ch.	Mill	375/250	250/1000
1	450	Whse.	8K	230	450/600
1	350	G.E.	CD-169	230	1150
1	200/250	El. Dy.	Ped. Brg.	230	400/1200
1	200	Whse.	8K-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whse.	8K-201	230	300/900
2	125	Whse.	8K-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30-S	230	450/1350
2	100	El. Dy.	30-S	230	475/950
1	80	Reliance	651-T	230	575/1150
3	50	Whse.	8K-131.5	230	600/2200
1	40	G.E.	CD-122	230	500/1000
1	40	Whse.	8K-140	230	500/1700
1	32¾	Whse.	8K-150	230	400/1200
2	25	Whse.	8K-93	230	1800
1	20	Cr. Wh.	D.P. B.B.	230	1150/2400
1	20	Whse.	8K-123	230	400/1200
1	15	G.E.	CD-85	230	575/2300
2	15	Whse.	8K-109L	230	600/1500
1	12	Reliance	158-T	230	400/1600
1	10	Whse.	8K-103	230	400/1600
1	10	Al. Ch.	E-132	230	300/1200
4	10	Whse.	8K-91	230	250/1000
1	7½	G.E.	CD-75	230	600/2070
1	7½	G.E.	CD-85	230	450/1350
4	5/7½	Reliance	T.E.F.C.	230	337/1350

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1	2500	Whse.	720	405	4160/2300
2	1250	Whse.	720	460	2300
1	800	Cr. Wh.	720	600	2300/440
2	500	Whse.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G. E.	1200	250	2300
3	200	G. E.	900	125/250	2300
1	150	G. E.	1200	250	2300
1	100	Whse.	900	250	2300
1	100	Cr. Wh.	1200	125	440/220
1	75	G. E.	1200	250	440/220
3	50	G. E.	1200	250	440/220

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No. 3N Nazel, self-contained.
No. 6B Nazel, self-contained.

LATHES
18"/36" x 60" ss Nobel gap lathe, 1941.
20" x 62" Axelson H.D. engine lathe, late.
24" x 8' LeBlond H.D. engine lathe.
14" x 6' Hendey Toolroom, 1946.
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MILLS
M-24 Kearney & Trecker Mfg. Mill
1-18 Cincinnati production.
2-18 Cincinnati production, late model.
Model 2-28 Kent-Owens hyd. mill, late (2).
60" x 48" x 16' Ingersoll adj., rail planer type.
No. 3H K & T plain horiz., new 1942.

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48" x 48" x 16' Gray Maxi-Service.

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200 ton No. 765½-72 Toledo D.C. Toggle drawing.
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845 ton No. H3612½ Hamilton Forging Press.

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1	3000	Whse.	Tandem	550	600
1	2200	G.E.	MCF	600	400/500
3	1500	Whse.	Rev	600	600
1	1400	G.E.	MCF	600	63/190
1	1200	G.E.	MCF	600	750/850
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-210	600	500/900
3	450	Whse.		550	415
1	350	Whse.		250	325/650
1	250	G.E.	MPC	230	400/600
1	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CB-5113	230	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
6	150	Cr. Wh.	83H-TEFC	230	890
1	150	Whse.	8K-151B	230	900/1800
1	150	Whse.	8K-201	230	300/950
1	150	G.E.	MCF	230	250/1000
1	125	Whse.	8K-161	230	500/1500
1	125	Whse.	8K-183	230	850
1	100	Rel.	1050T	230	400/1200
2	100	Whse.	8K-181	230	450/1000

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000/3400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	900 25cy 600		11000
1	2000	G.E.	514	600	6600/13200
1	1500	G.E.	720	600	6600/13200
1	1000	G.E.	720	600	2300/4600
2	750	G.E.	720	275	2300/4600
1	750	Whse.	900	250	2300/4000
1	600	G.E.	720	250	440/2300
1	200	Whse.	1200	250	208/440/550

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
1	2000	Wagner	HPW-20	3	24400x2400
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OISC	1	13200x460
3	667	G.E.	HD	1	12800x2300
3	500	Kuhl	DISC	1	2300x230/460
1	333	G.E.	HD	1	13200x2300
2	333	G.E.	HSWR 1		2300/4000x230/460
2	250	Penn.	DISC	1	24500x120/240

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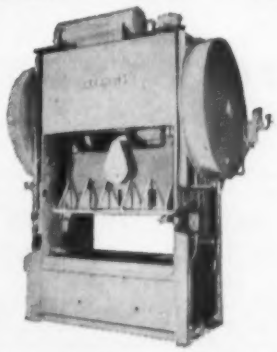

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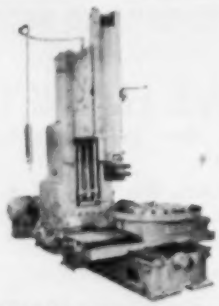

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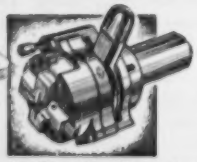

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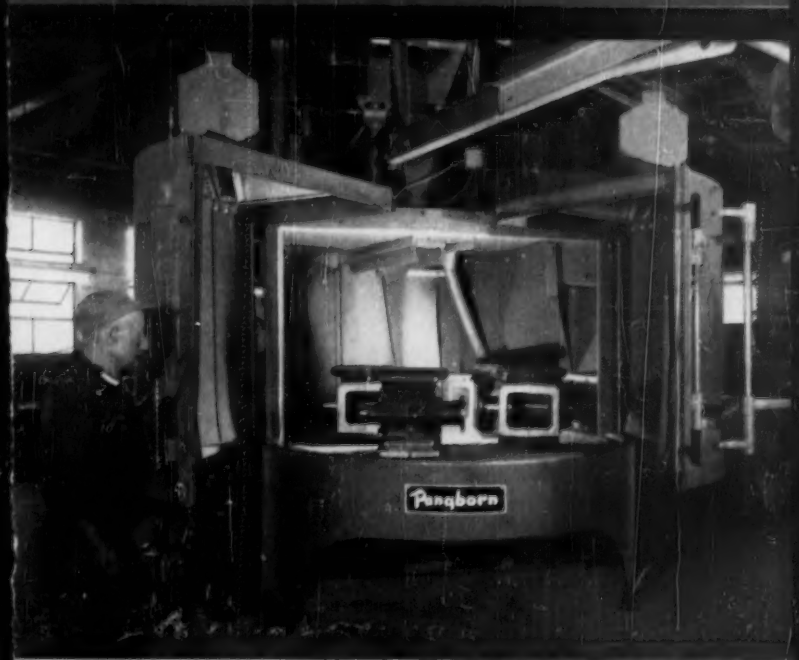

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*U. S. Patent 2164928 (other patents pending)

Standardize your forging procedures—use TIMKEN® steel forging bars

60 chemical checks keep them uniform—order to order, heat to heat, bar to bar!

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NO need to change your forging procedures to fit each order of steel, when you use Timken® steel forging bars. Their quality is so closely controlled you can *rely* on their uniformity.

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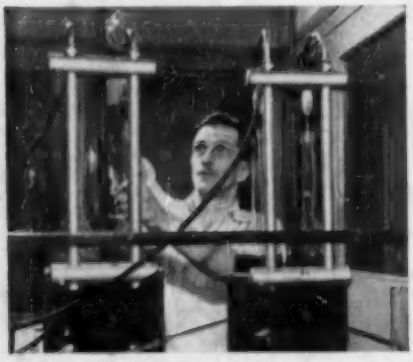
What's more, every order of Timken steel forging bars is "tailor-made" to meet your specific needs. Every subsequent order is matched to the first. And your order of Timken forging steel is handled individually in our mill and produced according to your specifications.

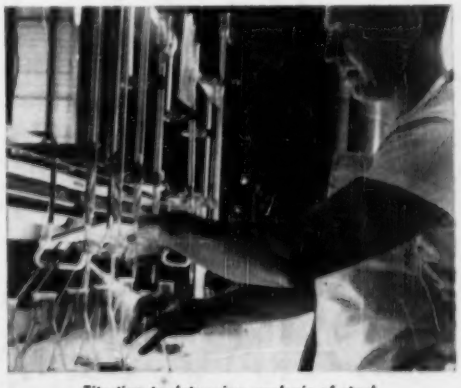
All this means you'll have fewer rejects, and less need to make furnace adjustments. You'll be working with steel of uniform high ductility and resistance to impact. With Timken steel forging bars, your forging procedures can be *standardized*.

Industry's first direct-reading spectrometer analyzes molten steel in 40 seconds



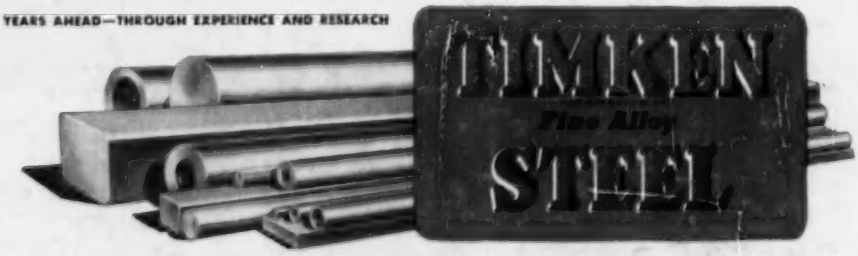
Some chemical tests require elaborate equipment

Our technical staff will help you choose the correct analysis for your forging job, based on their experience with many thousands of tough forging problems. If you are forging steels, you may find our technical booklet "Evaluating the Forgability of Steels" helpful. Just write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".



Titrating to determine analysis of steel

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



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